

High Value Agriculture Commodities & NTFPs in Western Nepal

Assessment of Value Chains in the
Surkhet- Dailekh, Surkhet- Jajarkot and
Surkhet-Jumla Road Corridor Districts



Ministry of
Agriculture
& Cooperatives
**Department
of Agriculture**

SNV

Connecting People's Capacities

Netherlands
Development
Organisation

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in the Surkhet- Dailekh,
Surkhet- Jajarkot and
Surkhet-Jumla Road
Corridor Districts

Part 1: Assessment of Value Chains

Part 2: Demand Side and Import-Export Analysis

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This report reflects the views of the authors and not necessarily those of
SNV or the Department of Agriculture.

Foreword

The Department of Agriculture (DoA) and SNV Netherlands Development Organisation are pleased to present this report which provides an assessment of more than 18 value chains already in existence or having the potential to be developed in the Mid-Western Development Region. This study – designed jointly by SNV and DOA, and conducted by Development Vision Nepal Pvt Ltd – clearly highlights that the poorest regions of Nepal do in fact have a lot of resources and opportunities in the agricultural and NTFP sectors, especially as areas are becoming increasingly accessible: blacktopping of the Karnali Highway, construction of a road between Jumla and Mugu are just some of the latest developments.

The report correctly emphasises the importance of two main factors when selecting and analysing value chains: market demand and pro-poorness. The latter can be further determined by other important factors like cash requirement and return per unit of land.

We hope this report contributes in the effort to combat the alarming food insecurity in the Karnali and other Mid-Western districts. High value cash crops can contribute to food security through the additional income earned from these value chains. Although road networks are increasing, studies in other areas have shown that this does not necessarily benefit the poorest. Extra efforts are necessary in order for poor and disadvantaged communities to actually capitalise on these new opportunities.

This valuable information has already led to one important project: the High Value Agriculture Project in Hill and Mountain Areas (HVAP), which is expected to start mid 2010 with IFAD funding, MoAC implementation and SNV advisory services. It is expected to take up 10 or more of the products described in this report, by linking producers directly with companies (buyers) through SNV's innovative Inclusive Business (IB) approach.

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All of you, thank you very much for contributing to this study!! Now at the time of publishing in 2009, it can already be said that it contains highly relevant information which came at the right moment.

SNV Nepal

Table of Contents

Acknowledgements	2
ABBREVIATIONS	6
PART 1: Assessment of Value Chains	7
EXECUTIVE SUMMARY	8
I. INTRODUCTION	13
1.1 Roads Corridor and Their Characteristics	14
1.1.1 Chhinchu-Jajarkot Road Corridor	14
1.1.2 Surkhet-Dailekh Road Corridor	14
1.1.3 Surkhet-Jumla Road Corridor	14
1.2 Study Districts and Their Characteristics	14
1.2.1 Salyan	14
1.2.2 Jajarkot	14
1.2.3 Surkhet	15
1.2.4 Dailekh	15
1.2.5 Kalikot	15
1.2.6 Jumla	16
II. OBJECTIVES	21
III. METHODOLOGY	18
3.1 Value Chain Surveys	18
3.2 Methodology by Objectives	20
3.2.1 Objectives i) and ii)	20
3.2.2 Objectives iii), iv) and v)	22
3.2.3 Objective vi) (Food security)	22
3.3 Product Characterization Matrix	22
3.4 Limitations of the Study	23
IV. STUDY FINDINGS	24
4.1 Products Movement Funnels in the Road Corridors	24
4.2 Products Set	25
4.3 Crops Calendar and Seasonality	26
4.4 Prioritized Products	28
4.5 Product Value Chain Analysis	28
4.5.1 Enabling Environment	29
4.5.2 GON Targets on HVA Crops	31

Table of Contents Continued...

4.6	Value Chain Activity Analysis by Products	33
4.6.1	Cole crops (Cabbage and Cauliflower)	33
4.6.2	Off-season tomato	35
4.6.3	Green bean and green pea pod	38
4.6.4	Carrot and Radish	40
4.6.5	Green hot chilly	41
4.6.6	Ginger	44
4.6.7	Garlic	47
4.6.8	Dry red chilly	49
4.6.9	Off-season onion	50
4.6.10	Apple	59
4.6.11	Walnut	62
4.6.12	Orange (Citrus)	63
4.6.13	Mango	67
4.6.14	Jatamasi	67
4.6.15	Timur	70
4.6.16	Rittha	71
4.6.17	Sugandhawal (Samayo)	71
4.7	Product Value Factors	76
4.8	Gender Analysis	77
4.9	Baseline of Value Chain Actors and Products	78
4.10	Food Security	80
4.10.1	Current Situation	80
4.10.2	Coping Strategies	82
4.10.3	Project's likely impact on Local Food Security	82
4.10.4	Suggestions for Food Security Improvement	82
V.	Action Plan/Recommendation	84
5.1	Social Mobilization and Awareness Creation	84
5.2	Organization of small producers into groups/Cooperatives	84
5.3	Infrastructure Improvement	85
5.3.1	Physical infrastructure for production/processing/Trade	85
5.3.2	Market infrastructure	85
5.3.3	Support for Service Infrastructure	86
5.4	Training	86
5.4.1	For traders	86
5.4.2	For Producers	86
5.4.3	For service providers	86
5.5	Research and Development	86
5.6	Support for Vertical Networking in the Value Chain	86
5.7	M&E System including Markets and Prices	86
5.8	Policy Influence	86
5.9	Other Recommendations	86

Table of Contents Continued...

PART 2: Demand Side and Import-Export Analysis	89
I. BACKGROUND	90
II. OBJECTIVE	90
III. METHODOLOGY	90
IV. AGRICULTURAL IMPORTS, EXPORTS AND TRADE BALANCE	95
V. ESTIMATES OF DEMAND AND SUPPLY	95
5.1 Domestic Demand	95
5.2 Export Demand for India	95
5.3 Market Arrival of HVAs	95
VI. DOMESTIC AND FOREIGN AGRI-TRADERS RELATED TO NEPAL'S AGRICULTURAL TRADE	95
6.1 The HVA and NTFP Traders	95
6.2 The Commitments	95
6.3 The Risks	95
6.4 Linking to Indian Cold Chain	95
6.5 Non-Tariff Barriers on Export to India	95
6.6 The Recent Developments in Trade	95
VII. RECOMMENDATIONS	95
7.1 Improving Government Statistics on Production of HVAs	95
7.2 Financing for Trade	95
7.3 Fruit Wholesale Mandi at Kathmandu	95
7.4 Defining and Monitoring the Product Standard	95
7.5 Producing the Production Profile of HVA Commodities and NTFPs	95
7.6 Promulgation of Contract Farming Act	95
7.7 Going the Organic Way	95
Annex-1: Plant Quarantine Offices within Nepal	95
Annex-2: Export of HVA Commodities and NTFPs from Nepal, 2006/07	95
Annex-3: Import of HVA Commodities and NTFPs from Nepal, 2006/07	95
Annex-4: Export of HVA Commodities and NTFPs from Nepal, 2005/06	95
Annex-5: Import of HVA Commodities and NTFPs from Nepal, 2005/06	95
Annex-6: Basis for Demand Calculation (Minimum Consumption Requirement)	95

Abbreviations

ADBN	Agricultural Development Bank of Nepal	INGO	International Non-Government Organisation
ADO	Agriculture Development Office	kg	Kilogram
amsl	above mean sea level	KIS	Key Informant Survey
APP	Agriculture Perspective Plan	km	kilometre
APPSP	Agriculture Perspective Plan Support Programme	LHF	Leasehold Forest
CBS	Central Bureau of Statistics	LLP	Local Livelihood Project
CCI	Chamber of Commerce and Industries (District chapters)	LRP	Local Resource Person
CDR	Central Development Region	m	metre
CECI	Canadian Centre for International Studies and Cooperation	masl	Meters above sea level
CEPREAD	Centre for Policy Research, Environment and Agricultural Development	MFSC	Ministry of Forest and Soil Conservation
CF	Community Forest	MLD	Ministry of Local Development
CFUG	Community Forest User Group	MOAC	Ministry of Agriculture and Cooperatives
CGRS	Competitive Grant Research System	MPFS	Master Plan for Forestry Sector
CLDP	Community Livestock Development Project	mt	metric ton
DADO	District Agriculture Development Office	MWDR	Mid Western Development Region
DDC	District Development Committee	NAP	National Agriculture Policy, 2004
DDC	District Development Council	NARC	Nepal Agricultural research Council
DEPROSC	Development Project Services Centre	NARDF	National Agriculture Research and Development Fund
DfID	Department for International Development, United Kingdom	NGO	Non-Government Organisation
DFO	District Forest Office	NHCC	National Herbs Coordination Committee
DTO	District Technical Office	NTFP	Non-Timber Forest Product
EDR	Eastern Development Region	PF	Private Forest
FWDR	Far Western Development Region	OS	Off Season
FECOFUN	Federation of Community Forest User Groups of Nepal	RDA	Regional Directorate of Agriculture
FGD	Focus Group Discussion	RIP	Rural Infrastructure Policy, 2004
FSMAS	Food Security Monitoring and Analysis System	RRN	Rural Reconstruction Nepal
G4E	Governance for Empowerment	SHCC	Smallholder Cash Crops
GIS	Geographical Information System	SIMI	Small Irrigation and Marketing Initiative
GO	Governmental Organisation	SMP	Social Mobilization Package
GON	Government of Nepal	SNV	Netherlands Development Cooperation
ha	Hectare	SPS	Sanitary and Phyto-sanitary
HVA	High Value Agriculture	sq ft	square feet
ICIMOD	International Centre for Mountain Development	UA	Uttaranchal
IFAD	International Fund for Agriculture Development	UP	Uttar Pradesh
		VCD	Value Chain Development
		VDC	Village Development Committee
		WDR	Western Development Region
		WFP	World Food Programme
		WTO	World Trade Organization
		WUPAP	Western Uplands Poverty Alleviation Project

PART 1

Assessment of Value Chains

Executive Summary

Dried Apples



Efforts on crop diversification accompanied by global trade liberalization have led many developing countries to switch over to the production of high value agriculture (HVA) crops, especially targeting the export markets. The Hill and Mountain districts of Nepal, which are heavily afflicted by remoteness and mass illiteracy leading to mass poverty and deprivation hold enormous potential for the production of many HVA crops and NTFPs based on market potential and solutions which, to a considerable extent, could address the widespread poverty issue of these districts. Realising this, SNV Nepal sponsored a study on the value chain analysis of major HVA products and NTFPs in the selected hill and mountain districts of mid-western region.

The study covers the areas of districts that are influenced by 3 road corridors: i) Chhinchu-Jajarkot ii) Surkhet-Dailekh and iii) Surkhet-Jumla. These road corridors together provide access to a number of districts viz Surkhet, Dailekh, Jajarkot, Kalikot, Jumla, and considerable parts of other districts namely Salyan, Acham, Mugu, Dolpa and Rukum.

The main objective of the study is to prepare quality input to designing a future project to be funded by IFAD concentrating on examining and analyzing potentialities for the promotion of HVA crops namely fruits, vegetables, spice crops and NTFPs aiming at generating income, employment, food security through supports at different levels - production, transportation, storage, processing, packaging, marketing, etc.

The study is based on primary and secondary information collected from various sources - national statistics and other documents of government and non-government agencies, district level ADOs, DFOs, CCIs, farmers, business communities, industrialists, and exporters. These field officials were also interviewed to come up with more realistic data on production as well as value additions and potential value chains. The study team spent about 3 weeks in the field and collected a wide range of information from different groups in using different checklists and survey tools. Rapid surveys were conducted to enlist most important and traded HVA commodities (fruits, vegetables, spices, other crops and NTFPs), These commodities were ranked and prioritised in order of local importance, pro-poor potential and net

returns. The study area was also delineated based on maximum walking distance of one day from the nearest road head.

Three product sets based on altitude range are identified by the study. These include product sets in the altitude range of 310 to 1500 masl, 1500 to 2000 masl and above 2000 masl. For all sets in different altitude range different types of vegetables, fruits, spices, and NTFPs were identified. It is notable that some of the crops, especially the vegetables like potato cabbage, cauliflower, tomato etc are common for all altitude range whereas there are other products which have high potential only in certain climatic and altitudinal ranges.

The study also specifies high prioritized products for different road corridors. Timur, tomato, mango, cabbage, chilly, onion, ginger are amongst the high priority products in Chhinchu-Jajarkot road corridor. Likewise, timur, tomato, cabbage, chilly, orange, onion and ginger are the priority products in Surkhet-Dailekh road corridor whereas timur, Jatamasi, atis, carrot, radish, tomato, onion and apple are high priority products in Surkhet-Jumla road corridor.

Primary value chain list of products was developed based on secondary information which was further verified in the field with different stakeholders. The value chain lists were prepared for all the road corridors and for all products. There was a long list of value chains and it was not possible to work on all these chains though all value chains are equally important. Reducing their number based on certain criteria was considered necessary and it was made so by using two major factors: i) unmet market demand and ii) potential for increasing rural income particularly in favour of the poor.

The Value Chain Activity Analysis has been prepared for all the identified prioritized products covering crops, fruits, spices and NTFPs.

COLE CROPS, OFF-SEASON VEGETABLES AND SPICES

The cole crops are selected mainly on the ground of their high market demand, high cash generation and high potential for expansion. The pockets lying in the high hills and mountains (1,800-3,000 masl) can produce these crops during Mid-July to October when there are no such products in the terai plains and can readily cash the offseason advantage. Cauliflower and cabbage are among the major export items from Nepal to India for about 2-3 months (August to November) in a year.

There are several weaknesses who are identified by the study for different actors involved in cole crops. All the actors viz input wholesalers and retailers, growers, output wholesalers/ retailers, collectors, consumers, exporters etc seem to have suffered from one or other constraint to commercialize the products to add full value. Common constraints

noted are poor yield, poor quality and low cash income, unavailability of inputs in time, poor quality inputs; poor linkage between farmers groups, agrovet, output and input market; lack of collection centres and also poor transport conditions, etc.

Tomato is another major vegetable product selected based mainly on two grounds: i) High market demand and ii) high production potential areas involving high numbers of small and poor farmers of different social and economic classes. Production potentiality is high since it can be grown in all altitude ranges in the region. The estimated yield is reported to be 1.5 to 2.0 tons of fresh tomato per ropani and gross cash income ranges between Rs 22,500 to Rs 30,000 per ropani.

Quite a few numbers of constraints have been noted in tomato cultivation. These include: unfriendly domestic and export market and disease prone cultivar; compulsion to use poor quality seed; Poor services from Agro vet, Co-operative and DADO staff; weak technology, know-how, transfer of technology and market management; Inadequate knowledge and skill on tomato/on vegetable farming and marketing mainly on nutrition, disease, insect pest, post harvest (high yield gap); Value reduction through high product losses at each value chain level.

Green beans and green pea pods grown above 2,500 masl (metres above sea level in all the places) are another category of vegetables that have high potential as these are women and environment friendly (atmospheric nitrogen fixing by root nodules); low cost and high return; high unmet local and export demand; large number of poor farmers can participate because cash investment is low and the losses in handling are also lesser than other fresh vegetables.

The value chain actors involved in these products ranging from input suppliers to output sellers have numerous constraints to scale up the production and marketing. The problems relate mainly to quality, quantity and timeliness of inputs supply, lack of technical knowhow and skills, short harvest period, lack of financial supports from NGOs/ service providers, etc.

Carrot and Radish are also found as high potential products in the study area. These crops are women friendly and pro-poor, have high income potential have large unmet demand, and have high expansion potential.

Pockets of Kalikot and Jumla Districts with altitudes of 2,300 to 3,000 masl within Surkhet – Jumla road corridor are the most suitable areas for carrot and parts of Dailekh with similar

altitude range are suitable to grow carrot and 1,600 to 2,200 masl range for radish. Similarly, parts of Surkhet, Salyan and Jajarkot within Chhinchu-Jajarkot road corridor are also potential areas mainly for radish.

Several constraints are noted to commercialize the carrot and radish and the problems seem to occur for all actors. Lack of linkages, information gaps, poor technical knowhow are the common problems noted.

Green hot chilly is another potential product on account of import substitution potential, women and poor farmer friendliness and high return. Mid-July to mid-November are the off-season months for green hot chilly which can be produced in mid to high hills (700 – 1,500 masl). It is not a fast perishable crop and can be marketed over 3-10 days after harvesting and is regarded as a zero risk crop.

Virus and wilting of the plants are the problems faced by some semi-commercial and kitchen garden farmers. Local cultivar is the dominant variety in Dailekh, Surkhet and Kalikot which is facing deterioration of genotype.

Ginger is a major spice crop of the study area having high production potential. It is the cash crop for large number of small holder farmers; it is rain-fed, low cost and woman friendly; it has high internal and outside market in India and it is medium in the perishability scale.

Production areas with altitudes ranging from 700 – 1,800 masl are suitable for ginger and such areas are in abundance in Salyan, Jajarkot, Surkhet and Dailekh districts. About 60 percent of total production of rhizome goes to India.

Problems faced in ginger are high losses of seed rhizome (20-40%) in pits/stores; unavailability of quality seeds; volatile market, storage problems both for seed and fresh rhizomes, rhizome rot disease, inadequate mulching materials, short crop rotation system, inadequate use of organic manure and unavailability of yield enhancing inputs like humic and furic acid, amino acid, organic zyme manure, liquid organic potash and other micro-nutrients. Product losses range from 15-20 percent at wholesale level and 10-20% at retail level.

Indian administration is the main constraint for export of ginger. Their concerns are quarantine certificate, certificate of PRA organic and origin or production areas/site and import license.

The ADO office has little or no spices crop development programme and lack expertise in spice crops. The Ginger Research Station at Kapurkot of Salyan has limited research capacity and production of foundation is in limited quantity

due to lack of budget. The ginger processors are also constrained to increase their business volume due to market and pricing problem.

Garlic is selected as another potential product for value chain study. It is regarded as better cash crop for small farmers of high hills and mountains; it has ready export market to India; has high domestic market of local cultivars produced in high hills and mountain areas and is less perishable.

The areas ranging from 2,000 to 3,000 masl are best for Chinese garlic variety and 1,300 to 2,600 masl for local cultivars. Western parts of Jajarkot and villages lying along Surkhet-Jumla road covering parts of Dailekh and Jumla are best suited for this crop. Because of less perishable nature and high value low volume, farmers can produce this crop in more remote areas where poor producers live.

The constraints faced in ginger production are: scarce foundation seed production; lack of improved technology; and unorganized and scattered production.

Dry red chilly is another potential product that has high import substitution potential requires little cash input and is women friendly. Suitable production pockets for dry red chilly are areas with altitude ranging from 700-1500 masl. It is also a semi-perishable commodity and can be marketed as and when needed.

The problems are – primitive technology of production and processing with low yield, susceptibility to virus disease; poor linkages of agrovets to chilly growers; and scattered and unorganized production programme.

Onion is selected because of its import substitution potential and high return per unit land. The expansion potential in the study districts is huge. Nepal imports onion bulbs worth little more than three billion rupees from Nasik, India and production of onion bulbs from July to October could substitute the import considerably. Onion is also relatively less perishable.

Chhinchu-Jajarkot road corridor which covers parts of Surkhet, Salyan and Jajarkot and lies in altitudes ranging from 700 to 2,200 masl within 3-5 km of road heads are suitable areas for this crops. Similarly, Surkhet-Jumla Corridor which covers parts of Dailekh, Achham, Kalikot and Jumla are also equally suitable.

The problems are: mites, pink disease and tip burn, fungal disease and zinc and other micronutrient deficiency which can be corrected through use of miticide, fungicide and micronutrients. Other problems are difficulty to raise seedling due to monsoon rain; high weeding requirement; and difficulty in getting off-season onion variety seed.

FRUITS

Among the fruits, apple is the highly prioritized product for high altitude areas (2000 to 2800 m asml) because of its import substitution potential, high cash income and can benefit large number of farmers of all social and economic categories.

The climatic parameters required for apple are fully available in most parts of Jumla and some parts of Kalikot, Mugu and Dolpa. Apple is perennial fruit crop and has long productive life unless damaged by disease, pest and natural disasters.

About 15-20 apple trees can be grown in 1 ropani land which produces about 1,650 kg to 2,200 kg fruit. This gives about Rs 25,000 to Rs 33,000 gross income per ropani/year which gives an annual gross income of Rs 75,000 to Rs 165,000, enough for poverty elimination.

The problems faced in apple farming are poor access to technical knowledge inadequate sapling production, poor nursery management, poor weeding, feeding, raising root stock and grafted seedling, watering and manuring; and poor technical support and supervision from the concerned Government agencies.

The organized wholesalers are also lacking for apple and there is very little support from growers to wholesalers. The retailers viewed that the apples are not regularly supplied even in peak season and they receive non-graded and uncleaned fruit which incurs loss of about 10-15 percent.

Walnut, orange and mango are other fruit products demonstrating good production potential in the study area. Walnut is a non-perishable nut crop with high unmet demand. It is also high income generating crop and generates extra money from dye (leaves and barks) which provide additional benefits. The problem faced by the grower is the lack of grafted plants of improved thin shell cultivar. In walnut, the technology is needed to make the dried fruit white.

Orange is also a product with unmet market demand in which large number of small to medium farmers can operate and earn. It is also gender friendly and non-labour intensive. North faced barilands at elevation ranging 800-1,500 masl altitude are the most suitable areas for commercial orange farming. Most of the orange plants are of seedling origin. The major problems in production are major and micro nutrient deficiency, die-back virus, pink, root rot, powdery mildew, aphid scale and green sting bugs, etc.

Although mango is a tropical fruit variety it has potential for commercial farming in the low lying areas near road corridors. Off-season mango is considered as cash crop for low to mid hills farmers; it has good domestic market and

potential for export to India; has potential for production expansion; is women friendly and labour non-intensive.

Though mango is a tropical fruit crop, it can be a good cash crop for low to mid hill areas due to use of locally available and locally adopted cultivars. The fruits of these cultivars from hills come in market when Tarai varieties are almost off in the market. So it is an off-season crop for the mid hills.

NTFPS

Jatamasi, Timur, Rittha and Sugandhawal are the major NTFPs selected for the value chain study in the road corridors. These are important due to high return, value addition possibility, large scope for expansion, poor friendly, price rise prospect, etc.

Rhizome and leaves are the useful parts of jatamasi also having medicinal values. It is collected from the forest but it has been domesticated by farmers in community forests and private lands in Jumla. Jatamasi is fully exported first to India and then to other countries (e.g. perfume industries of France) after separation of active ingredients. In Nepal, 70 percent dried jatamasi is converted into primary oil extract and exported while 30 percent is disposed in raw form. About 33 mt of jatamasi is exported from the study districts,

Timur is harvested from a thorny shrub from the altitude range of 500-2,500 masl in sub-tropical region. The shrub is found in degraded slopes and shrublands. It is collected from the forest as well as grown in community forests, leasehold forests and private lands.

Total export of timur from the study districts (Salyan, Jajarkot, Surkhet and Dailekh) is around 200 mt per year of which about half comes from Chhinchu-Jajarkot road corridor. There are 15 collectors of timur (along with other NTFPs) in that corridor.

Rittha is a deciduous tree found in altitude ranges of 1,000 to 1,500 masl. The tree grows well in open sloppy and sunny conditions and the fruit has industrial use in producing shampoo, soap and detergents.

A major problem in Rittha that has been felt recently is the premature dropping of the rittha fruits which has reduced the net yield of cultivated rittha. Even the forest authorities have not found the reason for such problem.

Sugandhawal (Samayo) is a perennial herb found in the altitude range of 1,200-3,660masl which is grown in moist, north facing shady slopes of temperate region. it is an aromatic plant which is used in producing shampoo, perfume and other aromatic products as well as for medicinal

purpose. About 30 percent of Samayo is exported as oil extract.

Large scale processing is virtually non-existent except for rosin/turpentine and Jatamasi/samayo. Wholesaling is found to involve invisibility and fraudulent practices with the existence of monopoly and cartels. Value addition practices are noted at very small scale (about 5% of the products). It is revealed that the value of raw product can be increased from 50 to 100 percent with proper processing, handling, storage and other activities in the chain.

FOOD SECURITY

On the front of food security, long crop growing seasons, low crop productivity of conventional cereals, high population density and frequent natural calamities make the study districts quite vulnerable to food security. MOAC/WFP report on Rapid Emergency Food Security Assessment (EFSA), July 2008, for 9 districts of mid and far western region including 4 study districts shows negative overall district balance in calorie supply. Over 300,000 people were estimated to be facing a situation of food insecurity, with 50,000 people already in an acute food insecurity situation”.

The proposed project will have two distinct components – i) to improve productivity and returns of the existing HVA commodities and NTFPs and ii) expansion of acreage under HVA commodities and cultivated NTFPs. Both components are expected to improve the food security status of the households with increased income from HVA crops and NTFPs.

RECOMMENDATIONS

Based on the survey findings, following recommendations have been made for consideration during the design and implementation of the project.

- i) Effective social mobilization needs to be an integral part of the project to augment the social capital in villages or communities. Effective social mobilization has to be tailored to suit the context of the community being mobilized.
- ii) Organization of community into groups or cooperative is imperative, particularly for the poor producers/traders to achieve optimum scale of operation. In the study districts, the groups and cooperatives have been found to be organizationally very fragile and lasting only as long as the project/programme duration. Reasons leading to failure of groups/cooperatives must be fully investigated and addressed and in this context the existing groups can be socially mobilized and reorganized with no need to create other parallel groups.

- iii) The infrastructure for HVA commodities and NTFP production and trade is found to be very weak and inadequate. This has increased transaction costs of the producers/traders and foiled the value addition opportunities. The recommended physical infrastructures are: i) access or link roads between production and market centres, culverts and bridges ii) the gravity ropeway which does not require fuel or electricity and suitable for remote rural areas iii) market infrastructures viz mini and large mandis, cold storage (including small cellar, rustic and pit storages in the villages) weighing bridges, wholesale yards and stall, and iv) small irrigation facilities.
- iv) Various technical training to different stakeholders, i.e producers, traders and service producers are essential in order to enhance the much needed skills and technical knowhow to achieve efficiency in the process of commodity flow at various levels which really contribute to value additions.
- v) Research and Development (R&D) is the crucial component to be included as part of project package. There are many unexplored NTFPs, untested varieties of crops and trees, unknown insects, pests and crop diseases, yet to be adopted in the processes of value addition which could be addressed through effective R&D.
- vi) In view of little coordination among value chain agents and actors in the study districts and the monopoly and carteling system prohibiting easy entry into the chain, there is need to develop networks for promoting contract farming system for all crops.
- vii) The project requires supporting the vertical networking of the value chain system. This will result in low risk for overall supply in the event of crop failure; ensure more flexible production portfolios of smallholders together with higher quality of products and greater dependency of the smallholders on the production part.
- viii) Effective M&E system has to be introduced as part of project design which will make use of baseline information for evaluating incremental project performance; monitor the compliances set forth by the project at different levels and for all actors involved and ensure that adequate indicators for poverty, gender and inclusion have been incorporated to address the issues.
- ix) In view of the weaknesses observed in policy implementation in agricultural and forest sector, the Project needs to influence them in such a way that these are reformed and rectified where needed and enforced effectively in the spirit of value chain system.

Introduction

In the developing world including Nepal, High Value Agriculture (HVA) is growing because of rising incomes, urbanization and changing preferences. At the same time, global trade liberalization has opened export markets leading to increased foreign direct investments. These changes pose challenges to small and poor farmers because HVA often involve higher production costs and greater production and marketing risks. If these obstacles are not removed through close vertical linkages between farmers, processors, traders, retailers and buyers, there are chances that these small producers could be excluded from the supply chains. The increase in the production and consumption of these HVAs have been accompanied by changes in food supply chains and changes in characteristics of products demanded (food safety, convenience and perceived organoleptic qualities which are associated with price premia). The numbers of supermarkets and hypermarkets have grown rapidly as a transition from traditional stores and wet markets. The food standards have moved from public to private. Value added in the food processing sector has grown by 9 percent in the selected Asian countries. Most HVA commodities are characterized by perishability, high income elasticity, and high transaction costs. Unless smallholders enter into vertically coordinated supply chains with processors and retailers, they will have difficulty in adopting HVA.

Small holders must overcome a "real access gap" of being able to cost effectively transport their produce, before being able to address the "market efficiency gap" that revolves around being competitive with better organized, better informed and better capitalized scale producers.

The Hill and Mountain districts of Nepal, despite having enormous potentials, have been heavily inflicted by remoteness and mass illiteracy leading to mass poverty and deprivation. In these regions,

Chilli Peppers



only 16 percent of the geographical area is cultivatable, leading to high population density per unit of cultivated area. Due to difficult living conditions, temporary and permanent migration to Tarai, India and other locations is very common – often resulting in ominous consequences.

1.1 ROADS CORRIDOR AND THEIR CHARACTERISTICS

The 3 road corridors have influence areas in the hill and mountain districts of mid-western region and a small part of far-western region (Achham). The starting point is Chhinchu in Surkhet district falling at an elevation of 310 masl reaching up to the altitude of over 5,000 masl. The characteristics of each corridor are discussed below (see also Map 1 below):

1.1.1 CHHINCHU-JAJARKOT ROAD CORRIDOR

This corridor represents the areas covered by 107 km Chhinchu-Jajarkot road constructed in 1996/97 which is the main flow path of goods from Jajarkot, parts of Surkhet (Rakham, Thimni, Jyamirechaur, Jamunebajar, Gojokhola, Gajauda), Salyan and to some extent, from Dolpa and Rukum. The main market centres along this road corridor from the perspective of HVA commodities and NTFPs are: Mehelkuna, Chhinchu, Jahare, Gumi, Botechaur, Salli bazaar, Khalanga, Jagatipur, Sima, and Karkigaun.

1.1.2 SURKHET-DAILEKH ROAD CORRIDOR

This corridor represents the areas covered by 67 km Surkhet to Dailekh headquarter via Guranse which is the main flow path of goods from parts of Surkhet and Dailekh districts. The remaining parts of Surkhet and Dailekh have their goods flow path shared among the other two road corridors. The main market centres along this road corridor from the perspective of HVA commodities and NTFPs are: Rata Nangla (Surkhet), Guranse, Upper DUNGESHWAR, Tal Pokhari, Chupra, and Dailekh bazaar.

1.1.3 SURKHET-JUMLA ROAD CORRIDOR

This corridor represents the areas covered by 232 km Surkhet-Jumla road which is the main flow path of goods flow from Jumla, Kalikot, parts of Achham, Dailekh and Surkhet and to some extent, from Mugu. The main market centres along this road corridor from the perspective of HVA commodities and NTFPs are: Latikoili, Badichaur, Lower DUNGESHWAR, Ramaghat, Tunibagar, Rakam, Myanma, Nagma and Jumla bazaar.

In many study districts, the horizontal village link roads have been developed faster than the main vertical link roads. This has been possible through the implementation of DTMP in each district including the agricultural roads. However, the quality of such horizontal roads need to improved

as indicated in the recommendation section to render them usable even in the rainy season.

1.2 STUDY DISTRICTS AND THEIR CHARACTERISTICS

1.2.1 SALYAN

Salyan district with 47 VDCs has a total land area of 195,178 ha with 23 percent arable land, 64 percent forest and 11 percent pasture land. The elevation of the district ranges from 326 masl to 2,537 masl. As per the 2001 CBS population census, the population of the district is 213,500 constituted into 38,084 households and growing at a rate of 1.62 percent per year. Salyan is connected to Tulsipur Dang in the south by an all-weather road and to Rukum by a fair-weather road.

According to SNV/ICIMOD, 2006, the district is ranked 70th in terms of per capita income, 48th in terms of literacy rate and 62nd in terms of infrastructure development.

Salyan is famous for ginger production which occupies nearly 5 percent of the cultivated area. Orange and vegetables are also significant. The hat market at Kapurkot is popular destination for fruit and vegetable supply to Nepalgunj and Surkhet markets.

1.2.2 JAJARKOT

Jajarkot, the most remote and poor district in Bheri zone, has a total of 30 VDCs. According to SNV/ICIMOD, 2006, the district is ranked 66 in terms of per capita income, 61st in terms of literacy rate and 56th in terms of infrastructure development. The district has a total land area of 222,183 ha of which 25,751 ha is cultivable. The district is composed of mountains, hills and some plain land around Bheri river with elevation ranging from 610 masl to 5,412 masl. A road to district headquarter Khalanga operates only during off-monsoon period and during monsoon, the vehicle access is up to Salli bazaar. As per the 2001 CBS population census, the population of the district is 134,868 constituted into 24,147 households. Nearly 91 percent of the cultivated area is under cereal crops and fruits and vegetables including potato occupy less than 6 percent of the area.

Jajarkot's popular product is honey which is sent to Dolpa and Nepalgunj markets.

In the district, there is one cellar store in Dhime and one rustic store in Jhapra.

There are 12 I/NGO projects in Jajarkot the principle ones being Link/Helvetas, DEPROSC Nepal and Bheri Community Development Programme.

1.2.3 SURKHET

Surkhet houses the regional headquarter of Mid-western region. The districts total land area of 249,016 ha is constituted into 50 VDCs. As per the 2001 CBS population census, the population of the district is 325,831 distributed into 50,691 households and is growing every year. About 80 percent of the cultivated area is under cereal crops and fruits and vegetables including potato occupy just above 7 percent area. Groundnut is a significant cash crop of the district.

According to SNV/ICIMOD, 2006, the district is ranked 44th in terms of per capita income, 14th in terms of literacy rate and 50th in terms of infrastructure development. In this sense, it a better-off hill district in Bheri zone. However, Rajena VDC in the east and Ghatgaon VDC in the extreme west have serious poverty pockets. All VDCs of the district except Ghatgaon, Matela, Ranibas, Kafalkot and Rajena have road access.

There are 40 agro-vet shops in Surkhet and the nine agro-vets located in Birendranagar are wholesalers. In the rural areas, the agro-vets are located in Chhinchu, Malarani, Ramghat, Sahare, Ghumkhahare, Gumi, Satakhani, Mehelkuna, Maintadi and Kunathari VDCs. There are 28 I/ NGO projects working in the area of agricultural development in the district. Nepal SIMI, Link Helvetas, DfID, RRN, CECI (Sahakarya), LLP are the important ones. SIMI Nepal has constructed one plastic tunnel for vegetable cultivation and the drip system.

1.2.4 DAILEKH

Dailekh, with 150 sq km area constituted into 56 VDCs, is a hill district. The district is composed of high and mid mountains with elevation ranging from 610 masl to 5,412 masl. According to CBS population census 2001, it had a population of 225,201 constituted into 41,140 households. The population is growing at a rate of 1.85 percent per year. The district has 35,270 ha of cultivated land (23.5%), 78,137 ha of forest (52.1%), and 17,655 ha of pasture land (11.8%). In terms of road network nearly 90 km of Karnali highway passes through this district besides a fair-weather district road linking Surkhet to Dailekh district headquarter.

According to SNV/ICIMOD, 2006, the district is ranked 66 in terms of per capita income, 61st in terms of literacy rate and 56th in terms of infrastructure development.

Dailekh's popular product is orange. Orange from Dullu is like a brand name and oranges from other locations are also sold in the name of Dullu orange. Other significant fruit is off-season mango which comes to market in August when the mangoes in Tarai markets are already exhausted.

There are 20 cellar stores in Dailekh (Dullu, Paduka, Kalbhairab, Lakuri, Chhiundi and Dailekh



Map 1 with road corridors and districts

municipality) with a total capacity of 64 mt (only enough for about 13% of the orange produced) but 8 of these are non-functional. There are also 10 rustic stores (Lahara, Chamunda, Goganpani, Chauratha and Raniban) with a collective storage capacity of 40 mt.

1.2.5 KALIKOT

Kalikot, with 175 sq km area constituted into 30 VDCs, is a mountain district. The district is composed of high and mid-mountains. According to CBS population census 2001, it had a population of 105,580 constituted into 18,487 households. The population is growing at a rate of 1.75 percent per year. The district has 15,828 ha of cultivated land (9%), 106,056 ha of forest (64.6%), and 42,072 ha of pasture land (24.1%). The district is connected to Surkhet by a fair weather Karnali highway (151 km) and to Jumla (81 km).

According to SNV/ICIMOD, 2006, the district is ranked 66 in terms of per capita income, 61st in terms of literacy rate and 56th in terms of infrastructure development.

Among 4 major I/NGO projects in the district, DEPROSC Nepal and Karnali Integrated Rural Development Programme are working in irrigation development and Multipurpose Village Development Programme in fresh vegetable production.

There are 4 cellar stores in Kalikot (Pakha, Phoimahadev VDCs) with a storage capacity of 64 mt and 4 rustic stores (40 mt capacity in Daha, Bharta and Myanma VDCs). The lone market shed is in Myanma VDC.

1.2.6 JUMLA

Jumla, with 254 sq km area constituted into 30 VDCs, is a mountain district. The district is composed of high himalayas and high mountains with some flat high altitude plain. According to CBS population census 2001, it had a population of 89,247 constituted into 15,850 households (sparsely populated). The population is growing at a rate of 1.65 percent per year. The district has 14,743 ha of cultivated land (5.8%), 104,571 ha of forest (41.1%), and 66,225 ha of pasture land (26%). The district is connected to Surkhet by a fair weather road (232 km) and to Nepalgunj by air-route.

According to SNV/ICIMOD, 2006, the district is ranked 66 in terms of per capita income, 61st in terms of literacy rate and 56th in terms of infrastructure development.

Jumla is famous for apples. The apples from other districts like Kalikot, Dailekh and Jajarkot are also sold in the name of Jumla apple. Jumla is also a storehouse of over 100 different kinds of high value NTFPs (mainly jatamasi (spike nard) and silajit).

In this district, nearly 3/4th of the household and farm work is done by women. Men never touch the manure basket. It is believed that if unmarried females carried the manure basket, a sin will have been committed. The porters are 95 percent dalits.

There are 77 I/NGO projects operating in Jumla and about half of these are directly related to agriculture. Most important ones are World Vision, JAPEC, RDGP,

4S, JSDC, CRRN/SSP (SIMI Nepal), and KASASA. WUPAP project of MLD/IFAD is also operational in the district. The market centres are Jumla bazaar, Talium, Nagma, Narakot, Hatsinja, Urthu chautara, Dillichaur, Chautha bazaar and Manisangu.

Jumla Festival was organized in 2008 with a slogan which read "Organic apple and vegetables, the base for Jumla's development". DADO record shows 309 households having compact plantation of apple trees in around 420 ha area. There are 33 registered fruit and vegetable nurseries in the district. The district is recently declared as "Organic district" by the 14th session of the District Development Council. However, the declaration seems to have been done without much preparation, as remarked by some progressive farmers.

Although Jumla is a mountain district, it is better placed in terms of access to different parts of the district. The farthest VDC from district headquarter is Pandav gufa which is one and a half day walk (64 km). There are 43 completed village link roads in the district. There are 8 agro-vet shops in Jumla half of which are located in Chandannath VDC (Jumla Bazaar). Other agro-vets are in Sanigaun, Narakot, Kanaka sundari and Badki. There are 7 cellar stores (Chandannath, Talium and Katikswami VDCs) and 6 rustic stores (Patmara, Dillichaur, Garjyangkot and Depalgaun VDCs). There are 12 production cooperatives of farmers (Chandannath, Dillichaur, Badki, Garjyangkot, Lamra, Talium, Patmara, Kalikakhet VDCs).

Some basic information about the study districts has been given in Table 1.

Table 1: Basic Information about Study Districts

District	No. of VDCs	Population (2001)	Population growth rate (% per year)	Households	Total Area (sq km)	Average Persons family size	per sq km
Salyan	47	213,500	1.61	38,084	1,462	5.6	146
Jajarkot	30	134,868	1.68	24,147	2,230	5.6	60
Surkhet	51	288,527	2.45	54,047	2,451	5.3	118
Dailekh	56	225,201	1.84	41,140	1,502	5.5	150
Kalikot	30	105,580	1.73	18,487	1,741	5.7	61
Jumla	30	89,427	1.63	15,850	2,531	5.6	35

Source: DVN Compilation from different sources

Objectives

The main objective of the study is to prepare quality input to designing a future project to be funded by IFAD. The six specific objectives of the study are to:

- a) Examine and analyse secondary and primary data/information on high value agriculture (HVA) commodities (vegetables, fruits and spices), other cash crops and NTFPs -- having commercial value in the districts of Surkhet-Jumla, Surkhet-Dailekh, Surkhet-Jajarkot road corridors (Surkhet, Dailekh, Salyan, Kalikot, Jajarkot, Jumla and Achham).
- b) Prioritize and select the key HVA commodities and NTFPs that have potentials (future prospect) for pro-poor impact in terms of enhanced production, income and employment of the rural poor along the identified road corridors.
- c) Provide sufficient understanding on the value chains of the key HVA commodities and NTFPs and their future potential to realise increased production, income and employment for the rural poor dwelling in the above mentioned districts, to a wider audience of organisations, from government, non-government, donors and private sectors, with an interest to promote the identified value chains.
- d) Identify specific constraints and opportunities of the selected value chains, and provide solutions/recommendations on how to overcome constraints/make use of opportunities.
- e) Provide tentative baseline data on the current situation of selected value chains so that the impact of the possible project interventions through the services of local organisations and other relevant stakeholders can be made possible, and the pro-poor impact of the project can be evaluated.
- f) Assess local food security situation and issues including the potential impact of value chain activities on these issues; and provide recommendations for appropriate interventions.

Garlic



Methodology

Radish



The study is based both on secondary and primary information. Secondary information pertaining to current production levels and trends of hive value crops, NTFPs and horticultural products were collected for all the project districts and corridors from available sources like Agricultural Statistics and other documents of government and non-government agencies. These information provided a tentative guideline to explore and validate the data during field visits and stakeholder interactions. At the district levels, the ADOs, DFOs, CCIs, business communities, industrialists, and exporters were interviewed to come up with more realistic data on production as well as value additions and value chains which are the prime concerns of the study. The team collected primary data from various groups viz farmers, traders, processors etc which were used not only to validate the secondary data but also to come up with critical areas of interventions that support activities from production to marketing in the value chain. Commercial stakeholders at Nepalgunj market were also interviewed to capture market chains outside the study districts. The Team visited a fruit and vegetable mandi at Rupaidiha to get a general impression on the flow of fruits and vegetables across both sides of the border between Nepal and India.

The study was completed in three main stages: i) stage 1: desk study which included collection and review of secondary information, interactions with government and project officials, preparation and finalization of survey checklists ii) stage 2: field works involving walkthrough by all professionals along the three road corridors studied for about 3 weeks during the month of July-August and iii) stage 3: report preparation that involved interactive discussions within team, data analysis, draft report writing, incorporating comments and final report preparation and submission. Details of methodological procedures followed for the study are discussed hereunder.

3.1 VALUE CHAIN SURVEYS

SNV Nepal in its value chain approach wants to make use of the approach developed by Action For Enterprise (Value Chain Programme Design: Promoting Market-based Solutions for MSMEs, 2007) and encourages adaptation to that approach. Using this approach, the methodology

basically involved the collection and review of exiting available data/ reports/literature, followed by their analysis. Checklists for value chain analysis were prepared for soliciting information from a cross-section of the stakeholders which has been presented in Annex-1. Participatory tools (key informants, focus group discussions) were used while collecting information from a group of stakeholders.

A total of 42 group interviews/ discussions were carried out, the details of which are presented in Table 2.

Table 2: Focused Group Surveys for Primary Data Collection in Each Study Corridor

S.N.	Location	Name of Corridor	No. of participants	Type of participants
1	Salli bazaar	Chhinchu-Jajarkot	5	NGO Staff, Traders/shopkeeper,
2	Botechaur	Chhinchu-Jajarkot	21	NTFP cooperatives members and traders
3	Jahare	Chhinchu-Jajarkot	1	Farmer (Kurilo)
4	Rata Nangla	Surkhet-Dailekh	9	Farmers/growers and traders
5	Guranse	Surkhet-Dailekh	16	Farmers/growers and traders
6	Surkhet	Surkhet-Dailekh	6	Traders (Babu and shahi mandi)
7	Surkhet	Surkhet-Dailekh	1	Traders (Danda Sabji mandi)
8	Khadgabada (Sapti)	Surkhet-Jumla	3	Farmers
9	Chupra	Surkhet-Dailekh	10	Farmers/growers (Orange)
10	Upper Dungeshwar	Surkhet- Dailekh	1	Radio FM (Programme producer)
11	Upper Dungeshwar	Surkhet-Dailekh	6	Farmers/growers (Mango)
12	Sattala VDC-1, Daba	Surkhet-Jumla	2	Swastik Ragin and Terpaintain's employer
13	Sigaudi-5, Sishne	Surkhet-Jumla	6	Farmers
14	Rakam karnali	Surkhet-Jumla	15	Farmers/growers and Traders
15	Khidkijyula	Surkhet-Jumla	1	Hotel Owner
16	Dahi Khola (Pipalkot VDC)	Surkhet-Jumla	3	Farmers
17	Myanma	Surkhet-Jumla	4	ADO Office (official personnel)
18	Myanma	Surkhet-Jumla	1	SNV personnel
19	Myanma-9, Tadigaun	Surkhet-Jumla	5	Farmers/growers
20	Myanma-6, Badrigaun	Surkhet-Jumla	3	Farmers/growers
21	Myanma	Surkhet-Jumla	3	INGO/NGO personnel
22	Myanma	Surkhet-Jumla	4	Seed supplier, Government official
23	Myanma	Surkhet-Jumla	2	Kalikot CCI
24	Myanma	Surkhet-Jumla	2	Cooperative personnel
25	Kuni, Gela VDC-7	Surkhet-Jumla	3	Farmers
26	Phoimahadev	Surkhet-Jumla	2	Farmers/Traders
27	Chandannath	Surkhet-Jumla	7	Gov, official, Cooperative personal and INGO personnel
28	Chandannath	Surkhet-Jumla	2	DAO office (Official personnel)
29	Chandannath	Surkhet-Jumla	1	Himali Jadibuti Dev. Cooperative
30	Chandannath	Surkhet-Jumla	1	Jumla Farmers Cooperative Chairperson
31	Chandannath	Surkhet-Jumla	1	Jatamasi processor/Trader
32	Chandannath	Surkhet-Jumla	1	Apple Processing and Production Center (Officer)
33	Chandannath	Surkhet-Jumla	2	District Technical Office
34	Chandannath (Rajikot)	Surkhet-Jumla	2	District Horticultural Office
35	Chandannath	Surkhet-Jumla	1	District Botanical Office
36	Chandannath	Surkhet-Jumla	1	Apple, Walnut grower
37	Rupaidiha	India		Vegetable Traders
38	Nepalgunj	Nepalgunj-Surkhet	1	Hotel Owner
39	WFP-Nepalgunj	Nepalgunj-Surkhet	1	INGO Official
40	-Nepalgunj	Nepalgunj-Surkhet	3	JAWAN personnel
41	Nepalgunj CCI	Nepalgunj-Surkhet	3	Chairman, Official personnel
42	Dailekh	Surkhet-Dailekh	9	Official personnel, FECOFUN, INGO/NGO and Cooperatives

In addition to different market functionaries, about 25 consumers were also surveyed to get their opinion about particular products, quality, taste and price. Besides FGDs, Key Informant Survey (KIS) was also the major source of information collection for this study. KIS were identified locally in consultation with line agencies and farmers.

Survey Assistants: Carefully selected local research assistants, who were aware of the local situation and the sector, and who could act as guides to efficiently work at local levels were selected and used after training.

3.2 METHODOLOGY BY OBJECTIVES

The methodology and steps followed for each study objective (as given in Section 3) is enlisted below:

3.2.1 OBJECTIVES I) AND II)

In order to achieve objectives i) and ii) following sequential steps were followed:

- a) Rapid Survey to enlist most important and traded HVA commodities (fruits, vegetables, spices), other cash crops and NTFPs.

While passing through each corridor (Chhinchu to Salli bazaar; Surkhet to Rata Nangla to Guranse, Surkhet to Chupra via Tallo-Dungeshwar, Surkhet to Jumla), inquiries were made in the collection centres and chosen key informants about the HVA commodities and NTFPs passing through the road which comprised the primary list of products. These products were traced as to the source (District, VDC, pocket area) to construct the funnel for each corridor. The funnel is discussed in Section below.

- b) Ranking the commodities in the list in order of their importance using pair-wise ranking method. Two basic indicators – i) market demand, and ii) pro-pooriness of the commodity production and trade, were used as criteria for ranking. In pro-pooriness, 12 sub-indicators as follows are possible for determining the pro-pooriness of the product as follows:

- a. Returns to scale: This shows what happens to return if more of a selected commodity is produced/traded. For the poor, constant or decreasing returns to scale will be favourable.
- b. Labour intensiveness: This shows the days of labour involved to produce/trade a selected commodity. Since poor have generally less land and more labour supply (underemployment), more labour intensive commodities would be favourable.
- c. Cash requirement: This shows how much cash is needed to produce/trade a commodity. Since the poor have less cash for investment and low credit-worthiness with financing organisations, the commodity requiring less cash cost would be favourable.

- d. Value per volume/weight: A commodity with high value per volume/weight is favourable for the poor.
- e. Women-friendly: The women in the poorer households are nutritionally disadvantaged and overburdened with household chores. Therefore, a commodity requiring less work for women would be favourable for the poor.
- f. Perishability: The poor have generally no appropriate storage facility and hence non-perishable commodities would be favourable.
- g. Technicality: General low literacy level of the poor would mean that the production/trade of a commodity involving complex technology will not be favourable for them.
- h. Off-seasonality: Longer duration of off-seasonality of a commodity will provide more return for the poor.
- i. Return per unit land: A cultivated commodity having potential to generate more return per unit land will be favourable for the poor.
- j. Return per labor day: A commodity having potential to generate more return per day of labour involved will be favourable for the poor.
- k. First harvest gestation: Poor households will have urgent need for consumption and hence a product requiring longer time for first harvest (e.g. walnut will bear first fruit in 9 to 10 years) will not be favourable for them.
- l. Market demand: Since poor households require urgent income, quick selling commodities will be favourable.

However, only 5 indicators namely labour intensiveness, cash requirement, technicality, return per unit land and first harvest gestation, were taken with weights determined by local FGDs (Table 3). Labour intensiveness is for landless poor, cash requirement is for ultra-poor with very little cash income, technicality is for illiterate poor and other two are for common poor.

During FGDs at various locations, the exercises of providing scores based on the scale of 10 were carried out along with the weights for each sub-indicator. These scores were adjusted for future potentiality. The results are provided in Tables 12, 13 and 14 for Chhinchu-Jajarkot, Surkhet-Dailekh and Surkhet-Jumla road corridors respectively which formed the basis for filling the priority matrix for each road corridor. By construct, the products falling around the right upper corner of the matrix are important as these represent products with both high demand and pro-poor potential.

The HVA commodities and the NTFPs are favourably grown or collected in different altitude ranges. The lowest altitude in the given corridors is 310 masl at Chhinchu. These altitude ranges have been broadly classified into 3 major categories – i) the tropical to sub-tropical conditions prevailing in the range between 310 masl to 1,500 masl; ii) the sub-tropical range between 1,500 to 2,000 masl; and iii) temperate region above 2,000 masl. The

major characteristics of these ranges with regard to HVA commodities, NTFPs and food security are outlined below:

The tropical to sub-tropical range (310-1,500 masl)

The characteristic of this zone is as follows:

- Partly tropical to sub-tropical climate
- Winter mild to frosty cold winter
- Summer warm to mild in upper parts
- Mango to citrus and plum grow well
- Sal to chilaune trees are commonly found
- Rittha, ban kurilo are the common NTFPs
- Tomato, onion, hot chilly and beans are common vegetable crops.
- Ginger and turmeric are the common spice crops
- Up to two crops per year is possible
- More seasonal migration of people
- Maize, Wheat, rice, pulses are main food crops

The sub-tropical to warm temperate range (1,500-2,000 masl)

The characteristics of the areas are as follows:

- Sub-tropical to warm temperate climate
- Winter months are cold and frosty
- Summer months are mild with high humidity
- Pine trees, rhododendron, chilaune and utis are common forest tree.
- Peach, plum, pear are the common fruits.
- Maize, wheat, rice and potato are the common staple crops.

- Mostly rain-fed bari-land
- Garlic, ginger and timur (*Zanthoxylum armatum*) are important spice crops.
- Because of more off-season vegetables, the seasonal migration is less

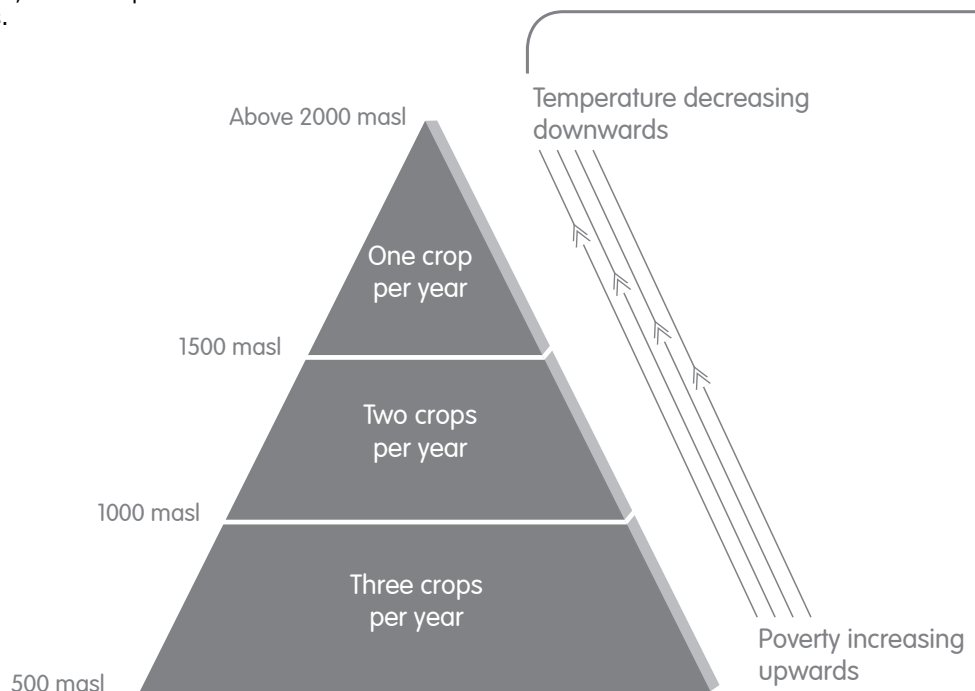
The Temperate range (> 2,000 masl)

The characteristics of these areas are as follows:

- Cool temperate climate
- Snow fall in winter months
- Mild summer month (20-24°C)
- Low rainfall
- Apple, walnut, almond, peach pear, plum are the important fruit crops
- Cabbage, Cauliflower, carrot, potato green pea, tomato, onion are the important off-season vegetable crops
- Sugandhawal, Jatamasi (*Nardostachys grandiflora*), panch aunle are the important NTFPs
- Pine trees are the main forest trees
- Potato, maize, barley, wheat, buckwheat are main food crops
- Preponderance of rain-fed bari-lands.
- Beans are common pulse crops and are used extensively as dal and vegetable.

Diagrammatic representation of these altitudinal ranges is shown in Figure 1.

Figure 1: Altitudinal classification modality for HVA and NTFPs



3.2.2 OBJECTIVES III), IV) AND V)

For each product selected above, following details have been provided:

- Value chain mapping
- Description and characterization of value chain actors (private sector, including degree of organisation of producers (cooperatives, user groups), traders (including business membership organisations), and support organisations (relevant NGO and GO, financing organisations). Persons and organisations met and interviewed in this context have been listed in Annex-1 including contact address and phone numbers where available so that the future mission would find it easier for validation and further probing.
- Baseline data on producers/collectors, products (area, production by district), indication of income generated, etc.
- Description of potential markets and market demand.

3.2.3 OBJECTIVE VI) (FOOD SECURITY)

Under objective vi), following issues have been discussed:

- Current food security situation for each district by belt.

- General description of livelihood strategies.
- Potentials and ways for increasing staples production,
- The manner in which VCD of the selected products impact food security. the expected extent of contribution from HVA and NTFPs to food security.
- Specific recommendations to increase food production or income for the most food insecure parts of each district, in the long or short term.

3.3 PRODUCT CHARACTERIZATION MATRIX

Based on the criteria listed in the methodology, the focus products selected for value chain analysis were characterized in terms of labour intensiveness, cash requirement, technicality, return per unit land and first harvest gestation. The result of the product's pro-poorness, and market demand is presented in Table 3.

Table 3: Product Scoring for Pro-poorness Determination and Prioritization

Pro-poor Indicators

Products	Labour intensive-ness	Cash require-ment	Technic-ality	Return per unit land	First harvest gestation	Market demand	Pro-poorness	Pro-poor ranking by product group
Weight for pro-poorness	2.5	2.5	1.5	1.5	2			
VEGETABLES								
Cauliflower	9	6	5	6	1	7	6.7	1
Cabbage	6	7	3	6	1	8	6.0	4
Tomato	9	6	7	7	2	7	6.4	2
Pea pods	7	6	5	8	2	7	6.3	3
Beans	8	7	5	5	2	8	5.9	5
FRUITS/NUTS								
Apple	4	6	6	8	8	7	4.2	3
Walnut	4	5	4	7	9	7	4.4	2
Orange	6	6	7	8	7	8	4.8	1
Mango	4	6	4	6	8	6	4.2	3
SPICES								
Ginger	9	4	6	7	5	8	6.4	1
Onion	8	5	4	7	4	8	6.4	1
Garlic	8	5	4	6	4	7	6.3	2
CASH CROPS								
Groundnut	7	7	4	6	4	7	5.5	3
Carrot seeds	10	5	9	9	5	9	6.3	1
Radish seeds	9	5	8	8	5	9	6.0	2
NTFPs								
Jatamasi	6	2	2	8	3	9	7.3	1
Timur	8	2	4	7	6	9	6.8	2
Rittha	5	2	2	5	8	7	5.6	4
Sugandhawal	6	2	4	8	6	9	6.4	3

Source: Based on Local FGDs at various locations and future prospects

3.4 LIMITATIONS OF THE STUDY

The study outcome must be reviewed against the following limitations encountered during the study:

- The study year 2008 has been an unusual year for the study districts (very early and heavy rain with high crop loss, probably due to global climate change effect) and hence average year information collection involved past recall which has its own problems in the less literate households with no practice of record keeping;
- The field visit had to be carried out at extreme odds of peak monsoon which limited observations of the interior production and trade pockets where more poor stakeholders dwell;
- The field visit period was also the peak migrating period of the local people and hence it was often difficult to gather enough discussants during the FGDs;
- The study and report production period was very short which may have caused some primary data to have been collected at heuristic level; and
- It was noted during interviews with stakeholders at different levels that a particular stakeholder (mainly the business stakeholder and mainly dealing in NTFPs) gave more or less correct information about other stakeholders hiding or manipulating its own information. So, the Team's strategy was to discover the truth from other stakeholders. Nevertheless, the invisibility observed in the trade sector may have some biased implications on data and analysis presented.

STUDY FINDINGS

4.1 PRODUCTS MOVEMENT FUNNELS IN THE ROAD CORRIDORS

The 3 funnels presented in Map 2 represent the outer boundary from where the products flow from a particular corridor. The criteria is the maximum of one day's walking distance from the nearest road head including the connecting roads to the main corridor road, completed or to be completed within next 2 to 3 years. First an idea of the connecting roads was obtained from District Technical Offices (DTOs) and also with the local respondents. Then, the last VDC points from where the products came, or could come, to the main corridor road were found out at different directions and marked in the map. Connecting these points gave rise to the shape of funnel for each corridor. It should be noted that each connecting road has its own smaller funnel but it was not possible to go to that detail in the short period of time.



4.2 PRODUCTS SET

The basic product sets (the traded HVA commodities and NTFPs) are similar in the corridors as all altitude ranges are found in the districts covered by the 3 corridors. These are listed by altitude range in Table 4 for 310 to 1,500 masl; Table 5 for 1,500 to 2,000 masl and Table 6 for more than 2,000 masl.

Table 4: The Primary HVA and NTFP Product Sets Traded in 310 to 1,500 masl Altitude Range

Product category	Products
Vegetables	Potato, Cabbage, cauliflower, Radish, tomato, brinjal, onion, cowpea, cucumber, bittergourd, beans, lady's finger, beet
Fruits	Mango, guava, orange, pear, litchi, banana, bel.
Spices	Ginger, turmeric, coriander, chilly, onion
Other cash crops	Groundnut, lentil, sunflower, soybean, cowpea, pigeon pea, mustard
NTFPs	Amala, Kaulo bokra, Kurilo, Timur, Dalchini, Bojho, Bhutkes, Lohan, Rittha

Table 5: The Primary HVA and NTFP Product Sets Traded in 1,500 to 2,000 masl Altitude Range

Product category	Products
Vegetables	Potato, Cabbage, cauliflower, Radish, tomato, brinjal, onion, cowpea, lady's finger, capsicum,
Fruits	Orange, lime, lemon, guava, pear, peach, plum
Spices	Ginger, coriander, garlic, akbare chilly, onion
Other cash crops	Broad leaf & mustard seed, potato, carrot seed,
NTFPs	Amalbed, Kaladana, Chirainto, Jhyau, Titepati, Padamchal, Pakhanbed, Bajradanti jara, Satawari, Satuwa, Silajit, Sugandhawal

Table 6: The Primary HVA and NTFP Product Sets Traded in higher than 2,000 masl Altitude Range

Product category	Products
Vegetables	Potato, Cabbage, cauliflower, carrot, tomato, pea pods, beans, capsicum, turnip
Fruits	Apple, pear, peach, plum, apricot, walnut, almond
Spices	Coriander, garlic, onion, hot chilly
Other cash crops	Carrot seeds, radish seeds, coriander seeds, broad leaf mustard seeds, silam, bean, lentil, buck-wheat
NTFPs	Atis jara, Kutki, Guchi chyaw, Jatamasi, Bisjara, Sugandhawal, Silajit, Jhyau, saffron

4.3 CROPS CALENDAR AND SEASONALITY

It is necessary to understand the seasonality of production and trade of selected HVA commodities and NTFPs. These are given in Table 7 for vegetables and spice crops, Table 8 for vegetable seeds, Table 9 for fruit trees, Table 10 for collected NTFPs and Table 11 for cultivated NTFPs.

Table 7: Calendar of operation of important fresh vegetable and spices crops.

Field operation	HV Vegetable and spices crops						
	Cole	Legume	Solanaceae	Onion	Ginger	Garlic	Dry Chilly
Seeding	Mar – Jul	Apr to early Aug	Mar – Jun	Mar – Jun	Mar – Apr	Jul – Sep	Mar – Jun
Transplanting	Apr – early Aug	-	Apr – Jul	Apr – Jul	-	-	Apr – Jun
Harvesting/ marketing	Jun – Oct	Jun to early Nov	Jun – Oct	Jul – Oct	Aug and Oct – Jan	May – Jun	Aug – Oct
Input supply	Feb – Mar	Mar – Apr	Feb – Mar	Feb – Mar	Feb – Mar	May – Jun	Jan – Mar

Note:

- Cole crops means cabbage and cauliflower
- Legume crops means green pea and green bean
- Solanaceous crop means tomato, green chilly and capsicum

Table 8: Calendar of operation of high value vegetable seed production

Field Operation	Tokinashi radish	Slow bolting coriander	Marfa broadleaf mustard	Carrot	C.Cabbage	Broccoli	Cauliflower
Seeding	Jun – Jul	Jun – Jul	Jun – Jul	Jul – Aug	Aug	Jul	Apr
Transplanting	Jul – Aug	-	Jul – Aug	Feb – Mar	Sep	Aug	May
Harvesting	May-Jun	Oct – Nov	May-Jun	May-Jun	Mar	May	Oct
Marketing	Jun – Jul	Dec – Jan	Jun – Jul	May-Jun	Apr	Jun – Jul	Dec

Table 9: Calendar of operation of high value fruit crops

Field Operation	Apple	Walnut	Apricot	Orange	Mango
Pit digging	Nov – Dec	Nov – Dec	Nov – Dec	Apr – May	Apr – May
Planting	Dec – Jan	Dec – Jan	Dec – Jan	Jun – Jul	Jun – Jul
Training and pruning	Dec – Jan	Dec – Jan	Dec – Jan	Dec – Jan	Dec – Jan
Manuring	Jan & Feb	Jan & Mar	Jan & Mar	Jan & Mar	Jan & Apr
Plant protection	Jan, Mar & Apr	Jan, Mar & Apr	Jan, Mar & Apr	Jan, Mar & Apr	Jan, Mar & Apr
Harvesting	Jul – Oct	Sep – Oct	Jul – Aug	Dec – Jan	Jun – Aug
Fresh Marketing	Jul – Oct	Sep – Oct	Jul – Aug	Dec – Jan	Jun – Aug
Storing	Sep – May	Sep – May	Sep – May	Dec – Mar	-
Drying	Sep – Oct	-	Sep – Oct	-	Pickle of dropped immature mango

Table 10: Calendar of operation for Collected Species of NTFPs

NTFPs	Flowering	Fruiting	Fruit/product Maturing	Season of Harvesting
Jatamasi	Jul – Sep	Oct – Nov	Oct – Nov	Seed: Oct – Nov Rhizome: Oct – Dec
Atis	Sep – Oct	Oct – Nov	Nov	Root, seed: Nov – Jan
Kutki	Jul – Aug	Sep – Oct	Nov	Seed: Mar – Apr Rhizome: Nov – Dec
Sugandhawal	Mar – Aug	Jun – Oct	Oct – Nov	Root/seed: Oct – Nov
Kurilo	May – Nov	May – Dec	Aug – Jan	Tuber: Nov – Mar Seed: Aug – Jan
Timur	Mar – Jun	May – Jul	Oct – Nov	Fruit: Oct – Dec
Rittha	May – Jun	Aug – Sep	Oct – Nov	Bark: Apr Fruit: Oct – Dec

Table 11: Calendar of operation for Cultivated Species of NTFPs

NTFPs	Seedling Production	Planting	Season of Harvesting	Seed /Rhizome Collection For propagation
Jatamasi	Oct – Dec	Jul – Aug	Seed: Oct – Nov Rhizome: Oct – Dec	Seed/ Rhiz: Oct – Dec
Atis	Feb – Mar	Apr – May	Root, seed: Nov – Jan	Root, seed: Nov – Jan
Kutki	Seed: Mar – Apr Rhiz: Nov – Dec	Jun – Jul	Seed: Mar – Apr Rhiz: Nov – Dec	Seed: Mar – Apr Rhiz: Nov – Dec
Sugandhawal	Seed: Apr – May Rhiz: Dec – Jan	Seed: Jul – Aug	Root/seed: Oct – Nov	Root/seed: Oct – Nov
Kurilo	May – Nov	Jul – Aug	Tuber: Nov – Mar Seed: Aug – Jan	Seed: Aug – Jan
Timur	Seed: Apr – May Cutt: Dec – Jan	Jul – Aug	Seed/fruit: Oct – Dec Bark: Apr	seed- Oct – Dec cutting: Dec – Jan
Rittha	Seed: Mar – Apr	Jul – Aug	Fruit: Oct – Dec	Seed: Oct – Dec

4.4 PRIORITIZED PRODUCTS

The HVA and NTFP products prioritized, following the process detailed in the methodology, for detailed value chain study are presented in Table 12 for Chhinchu-Jajarkot road corridor, Table 13 for Surkhet-Dailekh road corridor and Table 14 for Surkhet-Jumla road corridor.

Table 12: Prioritized Product for Chhinchu-Jajarkot Road Corridor in Matrix Form

Market demand ↑				
High	Litchi	Rittha Banana	Timur, Tomato, mango cabbage, chilly, onion (green and red), Ginger	→ Pro-poor potential
Medium				
Low				
	Low	Medium	High	

Table 13: Prioritized Product for Surkhet-Dailekh Road Corridor in Matrix Form

Market demand ↑				
High		Rittha, Banana	Timur, Tomato, cabbage, chilly, orange, Onion, Ginger	→ Pro-poor potential
Medium		Mango		
Low				
	Low	Medium	High	

Table 14: Prioritized Product for Surkhet-Jumla Road Corridor in Matrix Form

Market demand ↑				
High	Walnut	Jatamasi, Atis,	Timur, Jatamasi, Atis, carrot, radish, tomato, onion, apple	→ Pro-poor potential
Medium		Rittha		
Low				
	Low	Medium	High	

4.5 PRODUCT VALUE CHAIN ANALYSIS

Value Chain Selection

The listing of value chain were prepared with supports of secondary data from various sources and also from the primary data collected from different farmers groups, marketers, traders, retailers, leader farmers, co-operatives, NGOs and GOs.

Primary value chain list for chhinchu – Jajarkot road corridor

Off-season vegetable crops

- Cabbage, Cauliflower
- Radish, turnip, carrot, beet
- Tomato, brinjal, green chillie, capsicum
- Onion, bean
- Cucumber, bitter gourd
- Bean, pea

Fruit Crops

- Mandarin orange, lime, lemon, sweet orange
- Orange, litchi, guava, pear, peach, plum, walnut

Spices crops

- Ginger, dry red chilly, garlic
- Coriander, turmeric

Primary value chain list for Surkhet-Dailekh road Corridor

Off-season vegetable crops

- Cabbage and cauliflower
- Radish and turnip
- Bean, pea
- Onion, tomato and green chilly
- Cucumber, bitter gourd

Fruit crops

- Orange, lime, lemon, sweet orange
- Mango, litchi, guava
- Walnut, pear, peach, plum, apricot

Spices crops

- Ginger, turmeric, garlic, coriander
- Dry red chilly, Akabhhre khursani

Primary value chain list for Surkhet-Jumla road corridors

Off-season fresh vegetable crops

- Cabbage, cauliflower
- Green pea, green bean, broad bean
- Radish, Carrot, turnip, sugar beet
- Tomato, Green hot chilly, capsicum, onion

Fruit crops

- Apple, pear, plum, peach, apricot, walnut, almond
- Mango, orange, lime, lemon, sweet orange

Spices crops

- Dry red chilly, ginger, garlic

Prioritization of value chain

It was observed that there was a long list of value chains and it is not possible to work on all these chains though all value chain are equally important. Reducing their number based on certain criteria was considered necessary and it was made so by using the following criteria in tool box

- Unmet market demand
- Potential for increasing rural income

The objective of this project is to increase the cash income of small farmers of 6 hills and mountain Districts, however, high production of high value crop alone in absence of effective market demand does not increase the cash income of small farmers. It is hence, highest weight is given on demand of each value chain. This is followed by the potential increase in rural income. Based on these two criteria, different value chains are provided in the tables.

- High potential market demands with high opportunities for increasing cash income of small farmer value chains are presented in the last upper most column table 12 to 14. There are several off-season fresh vegetable crops. These value chains are accepted for further processing.
- Value chains that have high potential for increasing cash income but have low market demand are also shown in the tables. . These value chains are rejected for further consideration because in absence of effective market nothing go ahead. This is one of the mistakes we made in agriculture sectors in past in Nepal because in past, we missed markets and we gave high priority on production aspect only.
- Value chains that have medium market demand and low potential for increasing cash income are also shown in the tables and these are also dropped in present context because we have already identified value chains which have both high market demand and also high potential for increasing income. Similarly, high market demand in absence of poor productivity of high value crops does not benefit the small farmers.
- Value chains that have medium market demands and also have medium potential for increasing income are also shown in the tables. These at the moment are dropped out for further consideration due to available of better choices of value chains as described.

High market demand value chain in present case means

- Unfulfilled domestic market
- Never ending export market
- Import substitution

High potential value chain for increasing cash income means

- Value chains that have high productivity per unit area or have potential to increase through application of low cost technologies
- Value chains that have high market price and currently have no competitors due to comparative advantages.

4.5.1 ENABLING ENVIRONMENT

1) Brief description of enabling environment for the production and trade of selected HVA and NTFP products has been described below:

Policy/Legislation on HVA

Major policies governing HVA are:

Enabling ones:

- Devolution of agriculture extension services to local bodies, partnerships with the private and NGO sectors and contracting out some extension functions to NGOs and private sector organisations are two major policy shifts in agriculture extension;

- Similarly, the introduction of District Extension Fund in the implementation of APPSP (through DfID financing) are positive developments;
- The new NARC vision 2021 and NARDF subscribe a competitive grant research scheme (CGRS);
- Provision of constructing agricultural roads to production pockets; rural electrification, the development of production pockets with integrated infrastructure are some of the provisions of Agriculture Perspective Plan (APP) which helps to augment production;
- GON has recently released Rural Infrastructure Development Policy (RIP 2004) which has provisions to construct multiple facilities like irrigation, river control, rural roads and foot bridges – the policy envisages that the people in the hills and mountains will reach the nearest motor road-head within 4 hours (within 2 hours in Tarai);
- For facilitating the commercialization of agriculture, the Tenth Plan and the Nepal Agriculture Policy (NAP 2004) have introduced the concept of contract farming;

Disabling ones:

- Field experience reveals that the local governments are not yet fully prepared and capable to manage the devolved agriculture extension services – it is commented that the arrangement is only the addition of one hierarchy level;
- The necessary legal instruments and guidelines for contract farming have not been developed as yet;
- ADBN, the major formal financing institution for agriculture, is shying away from financing in agriculture.
- Although there is provision of unrestricted movement of products for trade, the frequent “bandha” and hassles has rendered the trader’s life difficult;
- The exchange rate of Nepali currency with respect to Indian currency is overvalued thus reducing the competitive advantage for the Nepali HVA products.

Policy/legislations on NTFPs

Master Plan for the Forestry Sector (MPFS, 1986) is the first policy document that recognises NTFPs as one of the essential components for the economic development of the country. It has recognized NTFP as one of the 6 overall primary programmes needing a serious attention. However, these have not been sufficiently translated into the annual programmes. The current 3 year interim plan, although just in its second year of its implementation, has also not been able to accomplish much. The Ministry of Forests and Soil Conservation (MFSC) has produced a policy document with an overall objective of conservation and wise use of these resources. The policy emphasises on:

- Conservation and utilization of NTFPs on the basis of sustainable development- provision

of Resource inventory and good harvesting practice

- Encouraging peoples` participation -promotion of NTFPs cultivation in LHF/CF/PF and producer groups, also involvement of protected and buffer zone area, networking of NTFP growers and cooperatives and value addition.
- Certification and tax simplification
- Development of proper technique
- Awareness creation, skill development and subsidy provision for NTFP cultivation, production and processing

There is an National Herbs Coordination committee (NHCC) headed by the Director General of Department of Plant Resource for the development and herbs and NTFPs. NHCC prioritized 30 medicinal plants for economic development of Nepal and 12 plants for agro-technology (cultivation).

Forest Act (2049) and By-Law (2051) stipulate the mechanism through which NTFPs are collected and traded. Forest Act lists the royalty structure for all types of the traded NTFPs (see Annex). The traders reported that the royalty rates are fixed on an ad hoc basis and do not correspond to their real values. For example, Jiwanti has an export value of around Rs.60 per kg but its royalty rate is Rs.100 per kg.

Every year MFSC allocates programs and budget for NTFP related activities. While the Department of Plant Research has been mandated to carry out the research both in terms of NTFP cultivation/ management and value addition, its achievement has been rather modest. The department runs its own nurseries and also trains communities to produce seeds and saplings. Likewise, the District Forest Offices have been producing some seeds and saplings in their nurseries for free distribution.

There are a number of projects that also support NTFP in the districts. Those include

- CECI (or CEPREAD and SAHAKARYA)
- Western Uplands Poverty Alleviation Project (WUPAP)

Disabling factor or Barriers and difficulties:

- Forest Act is heavily biased towards timber; NTFPs appear essentially in the annex only in which price list of a number of species has been given
- District Plant Research Offices do not exist in all districts, neither have they resources to serve the local needs. District Forest Offices do exist in all districts but they normally lack adequate resources or technical skills for effectively carrying out the tasks. They tend to focus on timber than the NTFPs.
- Number of policy decisions on NTFP are done on an ad hoc basis (e.g. fixation of royalty rates). While some species are totally banned

for collection transportation and export others can be exported only in processed form.

- Obtaining export permits are problematic. For many NTFPs, these can be exported only after processing but processing is not defined clearly leaving room for manipulation. The end uses of many exported products are not known.
- There is problem even for the processed products itself and its by-products. For example, one has to come to as far as the Department to get export permit of the Jatamasi and Sugandhawal oil extract. Another paradox is that the 'mark' cannot be exported for fear that the persons involved may deceitfully export the raw products in the name of 'mark'.
- The basis for fixing the price of NTFPS is also often ad hoc or even done on the basis of personal lobbying.
- Fluctuation of market price of the product adds difficulty to the producers. (e.g. two years back Rittha was fetching Rs 10/kg, which jumped to Rs 70/kg during the last year. When the farmers started producing more of this product the price went down to Rs 30 a kg. Nalkhola CF in Surkhet did not harvest Chirainto this year because of price anomaly.
- NTFP trade is considered in practice as a windfall business. This is subject to a number of official and unofficial taxes. Official taxes include DDC/VDC taxes, which lack much rigour in terms of fixing the actual charges (For e.g. Jumla DDC has been charging Rs 1.00/kg for jatamasi but recently it has been increased to Rs 5/kg). Likewise, education institutions like schools and colleges and the youth organisations too treat NTFP traders as milking cows.
- The barriers and check posts, which are authorised to unload the cargo extort the traders. This has forced some fair traders to give up their business (e.g. Puskar G.C, from Botechaur has abandoned his profession and Tandan from Nepalgunj has switched his profession from NTFP to gold.)
- NTFPs are considered invariably as forest products: Virtually all of the NTFPs are liable to official royalty irrespective of whether the products have an origin in the government forests or not. This is the case particularly in Timur and Rittha. Salli bazaar people claim that while 90 percent of the Timur has an origin in private land, they invariably pay 100 percent royalty to export this product. This has created a considerable disincentive for cultivation of the species in private lands.
- NTFP as unseen business: Unlike the fruits and vegetables, where the producers do know the end use of their farm products, this is not normally the case in NTFPs in which their end use is much sophisticated. Often the final product is produced outside the country. This contributes to invisibility in the trade of these products leading to less transparent price in each steps

of the market chain. Farther the product goes from the origin, lesser the transparency.

- Activity of some traders is damaging the reputation of business. Such practices include - mixing up of cheaper and similar looking materials in the original product (See Box-1); and fraudulent behaviour among businessmen, which causes unnecessary hassles to even the more honest traders. Practice of under invoicing is common in the area but these go unpunished after bribing at some times and heavily punished at other times. (see box 2)

4.5.2 GON TARGETS ON HVA CROPS

The GON has provided increasing attention to crop diversification and commercialization as a measure to poverty alleviation and export promotion. The interim plan (2007-2009) has targeted to achieve significant growth on the following HVA crops.

Table 14: GON Targets of HVA Crops

HVAs	Annual Growth target (%)
Fruits	8.77
Spices	18.44
Tea	15.77
Coffee	23.89
Vegetables	8.82

Source: NPC Interim Plan 2007-2009

These targets are much higher than that fixed for overall agricultural growth rate of only 3.6 percent. In other words, the interim plan is banking on the HVA products to achieve targeted agricultural growth. The measures to be adopted for achieving this growth is the improvement in infrastructure, effective implementation Nepal agricultural extension strategy (2006), emphasis on source seed production and distribution, legislating the product standards for trade under WTO regime, etc. The HVAs prioritised in the IP are apple and NTFPs in the mountains, Orange, junar, cardamom, dried ginger, garlic, tea, coffee and honey in the hills; and parwal, onion, garlic and honey in the tarai.

The government is slowly but surely moving in creating facilities and infrastructure needed to undertake trade under the WTO regime. The laboratory facilities for food testing have been upgraded by purchasing required equipment. The plant disease analysis have been completed for several important HVA products and these have been made available to the WTO members. The contract law for production has been drafted, although not yet passed from the parliament. In infrastructure, 50 percent subsidy on electricity tariff to operate cold stores has been provisioned.

Box 1: Rotten Eggs Spoiling the Broth

The price of dried timur at Nepalgunj wholesale market had hit an ever high value of Rs.140 per kilogram in 2004 – the collector farmers receiving as high as Rs.110 per kg. The local households from Salyan, Surkhet and Dailekh had started growing timur in private lands by relinquishing buffalo milk production which is considered a prestigious and financing rewarding occupation. A trickster in the market chain foiled all price gains through a dastardly act of mixing rubbish banmara (baramase) seeds which looked exactly like timur and which was available in plenty along the roadsides. When he was collecting the banmara seeds, local people had suspected a foul act but he was able to deceptively convince the local people that the oil from banmara seeds would fetch high price in India. He mixed the seeds with dried timur. When this was discovered in India, they dropped the import of timur from Nepal drastically and the price of timur plummeted to as low as Rs.25 per kilogram in 2007.

Few traders from Nepalgunj mixed stone pieces inside silajit and exported to India. When this was disclosed, Indian traders banned the import of silajit from Nepal. China has also been produce fake silajit and selling it through Nepal.

Gurche mushroom sells for Rs.14,400 per kilogram (2008 July) in Nepalgunj. A farmer from Jumla put stationary alpines inside the dried gurche mushroom resulting in no export from Nepal.

A wrong act from one actor in the chain affected the potential high return for all actors in different value chains. These sorry incidences call for a governance improvements through ways to provide incentives for quality compliance and strict market discipline. The adulterators and tamperers in food and medicines must be subjected to the punishment of highest order.

Box 2: Trapped When Trying to Outsmart

Forest based products in Nepal can not be moved without chalani purji (transport order) from the District Forest Office. There are Forest product Check posts along the roads for checking any forest product movements without transport order. A NTFP trader from Achham district obtained the transport order for 1.3 metric ton of Sugandhawal. He loaded his NTFP cargo from Tunibagar in Dailekh in a truck and proceeded towards Nepalgunj. The forest guard in Bangesimal check post, surkhet suspected of the foul-play and intervened to check the product. When he looked at the quantity of NTFPs carried in the truck, the guard's guess was about 6 mt. He immediately confiscated the truck and took it to District Forest Office at Surkhet. The culprit was sent to local police custody and subsequently to jail. After actual weighing, it was found that there was 8.7 metric ton of sugandhawal, bisjara and kurilo (dried asparagus roots), and 0.8 metric ton of silajit totaling over 7 times the quantity allowed as per the transport order and products (silajit, bisjara and kurilo) which were not even listed in the transport order and were far more valuable than sugandhawal. He was released from the jail after 1 month paying a large sum as deposit and another 250,000 as fine.

Such practice of under-invoicing is common in the area which goes unpunished after paying modest bribes to the forest guards and police. These work as disincentives for traders which opt for fair and competitive practices.

4.6 VALUE CHAIN ACTIVITY ANALYSIS BY PRODUCTS

4.6.1 COLE CROPS (CABBAGE AND CAULIFLOWER)

Why the product is selected?

- High market demand
- High cash generating crops
- High potential areas for expansion

Introduction: The high hills and mountains (1,800-3,000 masl) can produce these crops during Mid-July to October when there are no such products in the plains, Tarai and India (off-season). So, there is ready market – both domestic and export. Cauliflower and cabbage are among the major export items from Nepal to India for about 2-3 months (August to November). The increasing consumption of fried noodles in the study districts is also increasing the local demand for cabbage which is used in these noodles along with some green beans. The best growing conditions for off-season cabbage and cauliflower (low rainfall, high altitude) is available at Surkhet-Jumla road corridor which covers part of Dailekh, Achham, Kalikot and Jumla Districts.

The yield per ropani of cauliflower ranges from 700 – 1,000 kg and that of cabbage ranges from 2,500 to 3,500 kg per ropani. This gives the cash income of Rs 21,000 to Rs 30,000 per ropani in cauliflower and Rs 25,000 to Rs 35,000 per ropani in cabbage.

Small head (0.5-1kg) with tight green leaves and tight round cabbage head are the choices of the marketers and consumers. Similarly, small (0.5 – 1 kg curd head) white round shaped curd/heads in cauliflowers are the choices of the marketers.

Black rot, soft rot diseases and non-heading in cabbage are the main problems faced by the cabbage growers. These can be controlled through the use of appropriate cultivars and plant protection measures. Similarly, black rot disease and pink curd colours are problems of cauliflower and these problems can be prevented by the use of suitable cultivars and use of micro nutrients.

Actor's description and constraints faced by them:

Actors who are involved in tomato are also involved in these crops, it is, therefore, not repeated in detail here. Thus constraints which are different from the tomato are described.

Input wholesalers

- Lack of active agro-vets, co-operative etc as retailers in Kalikot, Jumla, Dailekh and they have very poor linkage with wholesalers and farmers. Few available Agro-vets are invariably located in the district headquarters because they do not find adequate business in the small and scattered production pockets.

- Agro-vets do not have adequate and sufficient advance stock of inputs at the required time.
- Unproven and often unknown variety seeds are imported and marketed. Farmers and local retailers are the sufferers. The seeds of these varieties are usually cheap because wholesalers are under pressure by multi-national companies to push up these varieties without field testing
- Duplicate seeds of same brand and same name are imported from India and Bangladesh.

Local input supplier/retailers

- Weak in technical, finance and business management hence unable to bring right variety seeds and others inputs in time.

Growers

- They are weak in technical know how and improved farming practices.
- Compelled to use untested and unproven cultivar seeds.
- Lack of skills to overcome the disease pest and micro nutrient problems. The production and post-harvest loss is 15-25 percent.
- Poor skills on post harvest handlings i.e. right time of harvest, grading cleaning and tracking. In absence of these operations, they have big losses (10-15%) in their farms and 10-25% in wholesale market. This reduces their cash income.
- Poor linkages with input wholesalers, output wholesalers and retailers.
- Lack of technicians to support them in technical and marketing matters. The demand driven policy of DADO bars poor producers from receiving technical support.
- Usually three crops of cabbage/cauliflowers should be grown and harvested in Dailekh, Jumla and Kalikot (April-June, June to August, August to October). However, they have been growing only one crop which is a lost opportunity. Because of the wrong and inadequate production and post-harvest practices, the yield gap is at least 200 kg in the case of cauliflower and 500 kg in the case of cabbage.
- An average farmer consumes about 25 percent of the produce and another 5 percent is given as gift to neighbours.
- No value addition of any sort except removing some large leaves in cauliflower takes place.

Output collectors

- In Jumla and Kalikot, growers themselves bring the product in market and directly sell to consumers. However, collectors collect at collection centre and send them to wholesalers.
- Lack of low cost suitable containers for transport to Surkhet.
- Unreliable transport system and bad roads from Surkhet to collection center and collection centre to production during peak season of this crop which happens to be in monsoon period.

- Small collection centres with inadequate facilities.

Output wholesalers

- Receive ungraded and unclean products.
- Unattractive cabbage head and cauliflower curd due to disease, pest and use of unsuitable variety
- Shape, size and colour are also not attractive. Good for local market.
- High losses in store and during transportation (15-20%)

Retailers

- There are fixed and mobile retailers. About 80 percent of the retailing in hills is done by women and it is exactly opposite in Tarai.

- Large size and unattractive appeared products, hence, difficult to sell. Cutting for sale to consumers reduces the storage life.

Consumers

- Demand a maximum of 1 kg size cabbage but the available sizes are much larger.
- Compelled to buy low to average quality unlike the demand for quality and fresh product

Exporters

- Good markets with attractive price in India but quality is not acceptable.
- Small size, green leaves with tight head cabbage has big market in India for about 2-3 months. A mandi wholesaler from Nepalgunj remarked – “If such quality cabbages are available, I can export 40 trucks per day in India from August to middle of November”. He further remarked – “same is true for tomato and green pea, the latter in little lesser quantity”.

Table 15: Selected constraints and market based solutions for Cole Crops

Constraints	Market based solution	Service provider
<ul style="list-style-type: none"> • Poor yield, poor quality and poor cash income • Timely unavailability of inputs and inputs are poor in quality • Difficult to sell and low price received • Poor linkage between farmers groups, agrovet, output and input market • Small collection centre/ lack of collection centre and also poor/bad road. During production of off-season fresh vegetable. 	<ul style="list-style-type: none"> • Provide field based training to growers on crop management. • Organize meeting/workshop between growers and input suppliers to improve these problems • Sell only tested and verified cultivar seed. Do not allow to import the untested cultivar seed. • Run training on market based production programme. Contract production at predetermined prices • Arrange at least two workshops or meeting between these stakeholders. Arrange exchange visit programmes of best practice sites. • Construct/upgrade all-weather roads and gravity ropeways (in potential sites) • Larger and more equipped collection centres with more collectors for competition. 	<p>DADO, NGOs with vegetable production support (like LLP, Japex), Agro-vets</p> <p>Input and output wholesalers</p> <p>DADO, wholesaler and NGO</p> <p>DDC, DADO, Collectors</p>

4.6.2 OFF-SEASON TOMATO

Why the product is selected?

- High market demand and high production potential areas involving high numbers of small and poor farmers.
- High cash income and is suitable for poverty reduction.

Introduction: Production of tomato from mid-June to mid-November is named as off-season tomato, which can be easily produced in the hills and mountain (1,300 to 2,200 masl) areas. During these periods, it has huge market both in Nepal and India because it is not possible to produce them in low hills, Tarai of Nepal and also in plain areas of India because of climatic reasons (mainly high night temperature above 22°C during June to November).

Similarly, it has got high attractive price compared to tomato produced during December to May in Tarai. It is reported that 1.5 to 2.0 tons of fresh tomato per ropani; (500 m²) is produced and gross cash income from this ranges gives Rs 22,500 to Rs 30,000 per ropani within 6 months of farming. The production cost, though varies from location to location, ranges from Rs 6,000 to Rs 9,000 including payment for hired labour. The income can be further enhanced if tomato is grown in low cost plastic house. The gross income per ropani from plastic house ranges from Rs 75,000 to Rs 100,000.

Bacterial wilt and late blight diseases are the main problems of farmers. Large size, weighing 80-100 gm with oblong/ovate shape along with the thick-skin tomato, are the needs of market. If these kinds of fresh tomato are available in Surkhet/ Nepalgunj, unlimited quantities can be exported to India as revealed by tomato wholesalers from Rupaidiha (India) and Nepalgunj mandies.

Although, it can be successfully and commercially produced at Jumla, but the best areas are barilands within 4-6 hours walk from house/farm to road head of Kalikot, Achham, Dailekh, Jajarkot and parts of Salyan Districts, the altitude of which ranges from 1,300 – 2,200 masl within and around 5 kilometer of Karnali high way.

Actors and their problems in tomato business

Input wholesalers

- They are also the importers of seed, tools, pesticides etc and also they collect seeds, organic pesticides from local producers and manufactures.
- They supply mainly to District or production area or collection centre Agrovets who supply to growers.
- Sometimes, the wholesalers also supply to DADO, NGO and co-operatives.

- The main problems faced by them are: what or which variety seed and how much quantity to be imported or locally collected is not known to them – weak in portfolio management. Many times, the inputs they supply are poor in quality because they buy in cheaper price and want to sell in high price parallel to high quality inputs.

Local input suppliers (Agrovet, Co-operative)

- They are the local retailers and they mostly receive the inputs from input wholesalers from Nepalgunj or Surkhet.
- Farmers reported that they supply poor quality inputs (mainly seeds) at high prices because they themselves receive poor quality seed or even local seeds which are less productive and also have poor germination, poor seed vigor and less seed viability.
- They are good service providers, but they are poor in technical know how. They also lack the salesmanship and marketing skills.
- They have poor linkages with growers and wholesalers

Tomato growers

- Less income earning due to poor productivity which is caused by use of disease prone cultivar, poor supply of plant nutrients and improper cultural and management practices. The yield gap is at least 20 – 30 percent of the potential.
- Low prices received due to unclean, ungraded and unmarketable fruits sold. The losses due to this ranges from 10 – 15 percent.
- Ignorant about market oriented production activities and poor knowledge on marketing, market price information.
- Compelled to use poor quality seed in terms of true to type cultivar, expired inputs and adulterated or mixed fertilizers, pesticides etc. Many a times, these result in big losses - as high as 30 – 60 percent.
- Farmers generally harvest when fruits are fully ripe and red. Tomato harvested in this way has poor keeping quality and can incur big losses during transportation. Harvesting just at turning colour stage has many advantages.

Output collectors

The collectors are either from production areas or from market centre. They collect tomato from growers at collection centre and send to wholesale marketers at Surkhet. They work on commission basis which ranges from 2 – 5% of total transaction from wholesale marketers. The problems faced by them are as follows:

- Small collection centre which lacks storage facility even for few hours, sitting space for growers, placing space for their loaded doko (bamboo and cane basket) with tomato.
- Unreliable and inappropriate transport system which increases the losses (5-10%)
- Irregular, inadequate and less diverse vegetables are received.

- Poor link road to production areas and also to wholesale market at Surkhet. This increases the cost.

Output wholesalers

The wholesale mandies are at Surkhet and also at Nepalgunj. There are 8 mandies at Surkhet and 13 mandies at Nepalgunj. They receive not only tomato but also other vegetables, fruits and also the spice crops like ginger and red chilly. They are importers and also are exporters.

They have groups of retailers who will sell within the cities. If they receive directly from growers or collectors they sell either at 7-10 percent commission or Rs 2-4 per kg. The cost of transport and handling is borne by tomato growers. However, if they receive from their own collector or their own agents, they sell at 50 – 60 percent of cost price from growers at collection centre. The constraints of wholesalers are as follows:

- Small mandi means limited space which is adequate for Surkhet or Nepalgunj market but extremely inadequate for export market
- Limited quantities of ungraded and unclean tomatoes are received. Marketers prefer tight and thick skin, ovate shaped, turning colour with 80 -100 gram fruits are rarely received. These kinds of quality tomatoes are easy to sell at high and attractive prices both in Nepal and India.
- Poor linkages with growers, input suppliers and others service providers like District Agriculture Development Office, Local Development Office, District and Village based NGO, cooperative and CBO.
- Sale in credit is the largest problem of wholesalers. About 5 percent of the sale is never recovered (some retailers run away by abandoning the business).

Retailers

There are three types of retailers:

- Dokes (producers) selling in a fixed place (changing two to three sites);
- Retailers buying from mandi and selling in a fixed shop; and
- Mobile retailers selling door to door with doko in hills and push-carts (thela) or open basket on head-top.

They are invariably poor. It was remarked in Surkhet that "when a person exhausts all his/her wealth, then he/she becomes a vegetable retailer". They go to home to home and sell in cash and also in credit for about 2-3 days for regular customers. They usually have defined territories of operation although about 20 percent fix their pushcarts or baskets in crowded market locations. There are about 80-100 Dokes in Surkhet. Consumers at Surkhet stated that vegetable from "Dokes" are cheaper and fresher than those non Doke retailers. Dokes usually earn Rs 100 – Rs 400 per day while non-dokes earns about Rs 300 – Rs 500 as gross

income. Apart from those there are hat/bazaars in fixed days of the week. Retailers are directly in contact with buyers and hence they do some value addition efforts (cleaning and wiping the tomatoes with towel for attractive and fresh look). But they say, it is expensive for them due to grading. The losses are about 6-15 percent of the total weight-purchased from wholesalers. However, the value increases so they can sell in attractive price. The problems faced by retailers are:

- Large or over sized products with undesirable shaped, colour and ungraded tomato received from wholesalers.
- Losses in weight and freshness (6-15%).
- Consumers want many types of vegetables

Domestic Consumers

The consumers are from cities like Surkhet and Nepalgunj. They are of all economic class. Preference for tomato and vegetable varies from rich to poor. The hill people like small (30-40 gm), round sour tomato for pickle and large with ovate shaped (80-100 gm) sweet tomato for salad. Similarly, Tarai people want large (Oblong, shaped 80-100 gm) sweet tomato. However, more tomato is consumed by Tarai people. Current study shows that rich and educated family consumes about 2 kg tomato per week which is 285 gm per day. This is about 58 gm per person per day. However poor and normal family consume on an average of 700 gm tomato per week. This will be 100 gm per day per family of 5 members. Some of the constraints raised by the Surkhet and Nepalgunj consumers are:

- Choices of vegetables/tomato (Large, small, sweet, sour, thin, thick skin etc) in terms of price, quality, diversities etc. inadequate and not diverse as per taste.
- Appropriate size, shape, colour, taste and freshness lacking
- Lack of packed vegetable or tomato (ready made vegetable) in different weight ranges in different low cost packs.
- Losses of tomato ranges from 0 to 4% depending upon type (over mature red, half mature, turning colour stage)
- Tomato purchased when they are stored in room conditions.

Exporters

Wholesalers at Nepalgunj also export to India, mainly at Rupadiha from which the Nepal tomato goes to other big cities during the periods of shortage in India. These periods are June to November but the worst period of shortage in Tarai and India is from June to September and from September to November, tomato from Nasik traveling about 1,100 km comes to Rupadiha. Rupadiha wholesalers stated that it is very expensive due to high cost to transport (about Rs 7 – 9 per kg) and high losses (Rs 4 – 6 per kg) of tomato (weight losses and rotten). This information indicates that even from September onwards Nepal tomato growers can easily compete

with Nasik tomato provided right varieties as per their requirements are produced. The Constraints of the exporters are as follows:

- Have very little tomatoes fulfilling the requirements of Indian markets and consumers.
- Low cost containers for export are lacking.
- The losses are very high (up to 20%).

Processors

Tomatoes can be processed to produce juice, sauce, pickles, dried flakes etc to add significant value. But Nepali tomato varieties are mostly suitable for pickles and dried flakes. Even for these, there are no processing facilities at Nepalgunj, Surkhet and other district headquarters of the region. This is done to some extent by the producers mostly for home consumption. There is possibility that over ripe, cracked and other kinds of waste tomatoes, which are not suitable for fresh market, can be utilized for these products at farm, co-operative or group level. But this needs dual purpose cultivar i.e. suitable for both fresh fruit sale and processing (high pulp, low moisture) activities.

The problems of processors are:

- Lack of dual purpose cultivars in use
- Limited production and limited surplus for processing.

Current study shows that demand for tomato ketchup, sauce, dust, hot chilly sauce, hot chilly powder, leafy vegetable powder, dry carrot from local hotel and restaurant is high but either skill of production and market promotion are lacking or the available quantity is not sufficient for optimum scale production.

Table 16: Selected constraints and market based solutions for Off-season Tomato

Constraints	Market based solution	Service provider
<ul style="list-style-type: none"> • Use of both domestic and export market unfriendly and disease prone cultivar • Compelled to use poor quality seed 	<ul style="list-style-type: none"> • Disease (BW and late blight) tolerance and market friendly cultivars like Thim-1, Thim-2, Sirjana, should be used • Lab and field tested cultivar seeds should be promoted and untested cultivar seed should not be allowed to import and sell. 	NARC, DADO, Agrovat, Co-operative SSQC, DoA, NARC, Importer, Agrovat.
<ul style="list-style-type: none"> • Service providers like Agro vet, Co-operative and DADO staff weak in technology know-how, transfer of technology and market management. 	<ul style="list-style-type: none"> • Provide training to service providers 	NARC, Training Division, DoA or private organization
<ul style="list-style-type: none"> • Inadequate knowledge and skill on tomato/on vegetable farming and marketing mainly on nutrition, disease, insect pest, post harvest (high yield gap) 	<ul style="list-style-type: none"> • Organize training for tomato growers to improve their tomato productivity and cash income 	DADO, service providers like Agrovats and co-operatives
<ul style="list-style-type: none"> • Value reduction through increase losses of tomato at each level. 	<ul style="list-style-type: none"> • Increase value of tomato by providing training (grading, packing, small processing), extension, transport and link road improvement services. 	DADO, DDC, WFP (village roads)
<ul style="list-style-type: none"> • Small and few collection centre and also Mandi 	<ul style="list-style-type: none"> • Increase the size of present collection and also open new and fully equipped centres at important road head. Also arrange to make large market centre at Surkhet both for export and domestic markets 	LDO, DDC, DADO, WFP

In Punjab (India), a processing firm has introduced the technologies of deep chiseling, new shovel technique of transplantation and bed-head planting of tomato. Within 3 years, tomato yield increased from 7.5 metric ton to 20 metric ton per acre. The harvesting season was also extended from 25 days to 70 days. These practices must be explored, tested and used in Nepal too.

Chinese apple box may be best for packing tomato (This is being done by one collector in Rata Nangla, Surkhet). It holds 25 kg tomato and is available at a price of Rs.10-12 per box. It can be used for 4-5 times. With this, the price per kg of packing comes to Rs.0.10 per kg which is a great value in terms of loss reduction in tomato and other vegetables.

4.6.3 GREEN BEAN AND GREEN PEA POD

Why the product is selected?

- Both vegetables are women and environment friendly (atmospheric nitrogen fixing by root nodules)
- Low cost and high return
- Market is never saturated meaning high market demand
- Both have domestic and export (Indian) market
- Large number of poor farmers can participate because cash investment is low
- The losses in handling are also lesser than other fresh vegetables.

Introduction: Green bean pods and green pea pods are attractive cash crops for high hills and mountain areas where the altitude is above 2,500 masl. These crops are cash crops when pods are produced from mid- July to October which can easily be produced in hills and mountain. It is, however not possible to produce them at mid hills, low hills inner-Tarai and Tarai areas during these months thus providing the important off-season price advantage. These are exportable crop to India and even others parts of Nepal.

The average market price of green pea ranges from Rs 40 to Rs 60 per kg in India during the off-season months and price goes sharply down to Rs 5 to Rs 8 from January to May. The green pea pod yield per ropani ranges from 500 – 700 kg which is equivalent to Rs 20,000 to Rs 35,000 gross income per season of 4 months. Similarly, price of green bean pod ranges from Rs 18 to Rs 25 per kg and per ropani yield ranges from 800 to 1,200 kg which gives Rs 20,000 to Rs 24,000 as gross income to the farmers. Green pods of pea and bean have not only high domestic but also have high Indian market from July to October.

These are not fast perishable vegetables and hence, can be grown within 6 hours walking

distance (about 5-6 km from road head) from road heads of Surkhet-Jumla road. High hills and mountain of Dailekh, Kalikot and Jumla above 2,500 masl, parts of Kalikot, Jumla have suitable production locations.

Because these crops are grown in high altitude areas, the diseases and inset pests problems are minimum. However, consumer and market preferred cultivars green pods of like Four season, Chinese cultivars of bean, Sikkim local Arkel and Azad varieties of pea should be used. Bean seed produced at high hills once Jumla is very attractive among the consumers even in Terai areas and also is a good income generating crop and need very low of external inputs.

Along with these cultivars, the use of Rhizobium and Phosphorus solubilising Bacteria for atmospheric Nitrogen fixation and making available soil fixed phosphorus is beneficial for boosting up of the productivity. Similarly, addition of chelated bio-calcium 1 kg per ropani (Biotin lime) will be very helpful for increasing the quality of the product. Apart from these the legumes can be grown in minimum tillage condition, hence, is helpful for carbon sequestration thereby reducing green houses.

Actor's description and their constraints

Input wholesaler

- Lack of effective retailers like Agrovets, Co-operative or produces groups in Jumla and Kalikot districts.
- Seeds and others input demands are unknown
- Poor linkages between wholesalers, retailers farmers and output marketers (Vegetable buyers)
- Less interest for lab and field testing (post control test) for quality assurance of seed

Local input suppliers

The suppliers are mainly agrovets, Co-operative, produces group. Constraints of these suppliers are as follows:

- They are service providers but they are very weak in technical skills and also in marketing skills.
- They have poor knowledge about the seed requirement of the farmers within their command areas.
- They are financially weak and financial institutions are not willing to finance them.
- They have inadequate linkages with farmers, farmers groups, wholesalers, DADO and others NGO.
- Growers reported they provide poor equality inputs. Hence, many elite and progressive farmers bring such inputs from Surkhet or Nepalgunj or even from Kathmandu.

Bean and pea farmers

In fact, they grow many crops and vegetable crop and they are farmers. In this context, they are treated as bean and pea farmers. The problems faced by them are:

- Seeds, others inputs and technical helps are not received in time.
- Seeds of true to type as wish are difficult to obtain.
- Short harvest period (25-30 days) and production and quality declines after 2-3 pickings.
- Unorganized farmers and thin scattered production. Not adequate for market.
- Weeds are the big problems and thus heavy cost involved in manual weeding.
- Lack of grading and cleaning after each picking

Output collectors

- It is non-existence in Karnali zone due to production of small quantity. Same quantities of local bean seed go to market.
- When large quantities will be produced, their presence is very important.

Output wholesalers

- They stated that there is a huge demand of green pea and green bean from June to October but supply is limited.

Retailers

- Limited Supply when demands from their consumers are high.

Consumers

- Green pea pod and green bean pods are their choices from July to November but regular availability is a problem.

Exporters

- Green pea and green bean have high demands from Indian marketers from June to November but lack of production in high hills and mountains are the constrain export promotion.

Table 17: Selected Constraints and market based solution for Peas and Beans

Constraints	Market based solution	Service provider
<ul style="list-style-type: none">• Lack of promotion of production and marketing programme.	<ul style="list-style-type: none">• Establish large size and large no. of field demonstration and verification• Provide training input supply and market management initially.• Promote through TV channel, FM and press conference	Wholesale marketer, DADO, NGO
<ul style="list-style-type: none">• Lack of skills on commercial bean and pea farming	<ul style="list-style-type: none">• Conduct field based practical training to producers, input suppliers (Agrovet, groups, co-operative)	NARC, DADO, Wholesaler
<ul style="list-style-type: none">• Poor awareness of farmers on commercial carrot and radish farming	<ul style="list-style-type: none">• Arrange visit to sailing areas Dailekh District where off-season green pea farming or commercial scale is carried out.	DADO, NGO

4.6.4 CARROT AND RADISH

Why the product is selected?

- Women friendly and pro-poor crops.
- High income generating crops
- High market demand and high potential production areas.

Introduction: Both are off-season cash crops when they are produced from mid-July to October months. The areas having the altitudes of 2,200 to 3,000 masl are the best for off-season carrot and 1,600-2,500 altitude ranges are best for off-season radish. The carrot yield per ropani ranges from 800 to 1,000 kg and that of radish ranges from 1,500 to 2,000 kg per ropani. The market price of carrot ranges from Rs 30 to Rs 50 while that of radish ranges from Rs 10 to Rs 15 per kg respectively.

The gross cash income per ropani of carrot ranges from Rs 24,000 to Rs 40,000 and that of radish, ranges from Rs 16,000 to 24,000 per ropani. Carrot takes 100-120 days to mature while radish matures – within 45 – 55 days of growing. The production cost for carrot is little more than that of radish.

Parts of Kalikot and Jumla Districts which have altitudes of 2,300 to 3,000 masl within Surkhet – Jumla road corridor are the most suitable areas for carrot and parts of Dailekh within the same altitude range can be used to grow carrot and 1,600 to 2,200 masl range for radish. Similarly, parts of Surkhet, Salyan and Jajarkot within Chhinchu-Jajarkot road corridor are also conducive areas mainly for radish.

Both are exportable crops and have domestic markets too. However, rich people are the good consumer of carrot and middle-class and poor people are good consumers of radish. Radish farming is cheaper and easier than carrot farming. Promotion of radish within 100 km of Surkhet is need for the benefits of farmers and relatively poor consumers.

Green neck and splitting of roots are the problems of carrot farmers and can be prevented by improved farming and crop husbandry practices. Similarly, soft rot is only the minor problem of radish and can be easily prevented through control of insects which bring this disease.

Actor description and constraints faced by them

Brief description of actors are presented on tomato and same actors are involved on these crops, hence, it is not repeated here and only constraints faced by them are presented.

Input wholesaler

Both carrot and radish seeds are produced in Nepal, but they are not promoted by seed wholesalers due to less profit to them.

- Poor linkages with seed producers and seed producer groups and farmers.
- Lack of seed and seed processing unit.

Local input suppliers

- Poor technical knowledge hence, unable to provide right advices to the farmers on improving yield and equality.
- Lack of simple seed testing system before sale and also is not interested on field test and demonstration in farmers field.

Carrot and radish growers

- Inadequate know how as off-season radish and carrot production.
- Poor knowledge on market need of radish and carrot. They want to produce large roots and like to sell but it is not liked by marketers and consumers (they want thinner ones).
- Poor communication with carrot and radish wholesalers, retailers and consumers like hotel, restaurant etc.
- Grading and cleaning are not carried out to improve value.
- About 20 – 40% produces are unmarketable due to under size, over size, branched, forked etc caused by poor crop management.

Output collectors

- Very little quantity is produced. However, whatever the quantity is produced near city/towns, they are directly marketed by growers as we can see at Jumla and Kalikot.

Output wholesalers

- Despite huge markets, there is no production for market.

Retailers

- Supply is limited.
- Very small quantity they receive from Kapurkot and manage to satisfy their clients.

Consumer

- There is no choice for consumers because there is no supply. So the problem is the production and supply.

Exporters

- Good exportable crops but supply is limited despite huge potentiality of production above 2,000 masl areas.

Table 18: Selected constraints and market based solutions for Carrot and Radish

Constraints	Market based solution	Service provider
<ul style="list-style-type: none">• Quality seed problems.	<ul style="list-style-type: none">• Promote Nepal produced seed through various promotional activist	DoA, DADO, SEAN
<ul style="list-style-type: none">• Promote for production and marketing	<ul style="list-style-type: none">• Organize training to growers and input and out marketers on production and marketing technologies. Establish large no of demonstration and verification plots and organize field days.	DADO, Co-operative, wholesale marketers, NGO
<ul style="list-style-type: none">• Farmers are unknown about the benefits of these crops farming	<ul style="list-style-type: none">• Organize visits of farmers to Mustang for carrot and Ranipauwa, Kakani for radish commercial farming and also Kalimati for carrot market.	DADO, NGO, FG

4.6.5 GREEN HOT CHILLY

Why the product is selected?

- Import substitution, hence, have huge internal market
- Women and poor farmer friendly crop.
- High cash earning crop.

Introduction: Mid-July to mid-November are the off-season for months for green hot chilly which can be produced in mid hills to high hills (700 – 1,500 masl) and the same quality is very difficult to produce in Tarai and low hills areas. This crop has huge internal and Indian markets.

It is not a fast perishable crop and can remain marketable for 3-10 days after harvest. It is a zero risk crop in terms of market and marketing. By any reason, if the green fruits are unable to reach market, the crop can be kept for red chilly which have equally good market with very long shelf-life.

It is estimated that average yield of green chilly per ropani ranges from 700 to 1000 kg which is equivalent to Rs 15,000 to Rs 20,000 gross income. The yield and price usually can go much higher. The marketing cost is very low compared to crops like tomato, green bean, etc.

Parts of Surkhet, Salyan and Jajarkot (1,300-2,000 masl), and parts of Dailekh District having bari lands the same altitude range of Kalikot District are the prime areas for this crop.

Root rot, crown rot and virus are the important diseases of this crop which can be controlled using

already available tolerant cultivars like local, NS 1701 and fire bomb which are successfully grown by the farmers. Thrips and mites are other minor insect pest problems which are controlled by locally available neem or titepati extracts which are organic pesticides.

Actor's description and constraints faced by them.

Since same actors as in tomato are involved on this crop, the description is not repeated here and only the constraint faced by them is presented.

This is a very potential cash crop for the farmers living within 700-1500 masl. However, not very much surplus quantities are produced for market. But it has high future prospect for productivity increase and price.

Input wholesalers

- Eighty percent of growers use their own saved seeds and other inputs from their homes and farm. Few are using improved cultivars like NS 1701 and Fire bomb which are provided by local agrovets.
- At the present wholesales has limited market due to production of green chilly in limited areas.

Local input suppliers

- Since farmers used their own saved local variety seed, the job of agrovets in supplying inputs and seed is very low.
- However, some agrovets are producing seed of local genotypes from selected plants and have

been selling those seeds to farmers. Farmers have found the seeds to be good.

- Similarly, these agrovets are also testing the improved cultivars like NS 1701 and Fire bomb in different farmer's field, with promising results.
- But the problem is that these agrovets lack the knowledge and skills on disease and insect pest behaviour, cause and control measures. Also, they have poor knowledge about nutrient problem, cause and correction measures.

Green hot chilly growers

- Virus and wilting of the plants are the problems faced by some semi-commercial and kitchen garden farmers.
- Local cultivar is the dominant variety of Dailekh, Surkhet and Kalikot which is facing deterioration of genotypes i.e. decrease in yield and decrease in length of green fruit are reported by the farmers.
- Farmers know that it is a profitable cash crop but road conditions at harvest time are very bad creating transport problems to wholesale markets. This problem is constraining the commercial production of this crop. Roads upgrading to all-weather status will witness substantial increase in hot chilly acreage in the

study districts because it has instant markets in Surkhet, Nepalgunj and even Rupaidiha, India.

Output collectors

- They are not available in chilly grown areas of Dailekh, Kalikot and Surkhet. Whatever is produced, is directly marketed by producer themselves.

Output wholesalers

- Very limited quantity is produced currently and the need for wholesaling is not felt. When it is commercialized, the same wholesalers who are dealing in tomato can undertake this business also.

Retailers

- Retailers usually receive the hot chilly directly from producers. The problem is short supply.

Consumers

- Consumers have limited choice in chilly and they take whatever is available.

Exporters

- There is Good market of green chilly during rainy season in India, but the problem is lack of adequate production in Nepal.

Table 19: Selected constraints and market based solutions for Chilly

Constraints	Market based solution	Service provider
<ul style="list-style-type: none"> Lack of promotion of production and marketing programme 	<ul style="list-style-type: none"> Field demonstration and verification of technologies and management phase Training and input supply Utilize TV channel, FM radio etc. 	Wholesales, marketer, DADO, NGO
<ul style="list-style-type: none"> Poor skills of farmers and marketers on commercial chilly farming Unorganized farmers on production and marketing of hot chilly 	<ul style="list-style-type: none"> Provide training to producer input suppliers, (Agrovet, Co-operative groups) collaboration on chilly farming Social mobilization training Group dynamisms on chilly farming 	DADO, marketers, NGO, NARC NGOs
<ul style="list-style-type: none"> Limited production of chilly 	<ul style="list-style-type: none"> Massive campaign for production Road improvement to all-weather status 	DDC, DADO, NGOs

4.6.6 GINGER

Why the product is selected?

- Cash crop for large number of small bari-land farmers
- Rain-fed low cost and woman friendly crop.
- High internal and Indian market
- Low perishability

Introduction: Low rhizome productivity caused by rhizome rot disease, poor crop management practices, unstable price and market are the main constraints faced by the ginger growers who are to a large extent small and poor farmers of the hills. Areas having the altitudes ranging from 700 – 1,800 masl are suitable for this crop and such suitable areas are in abundance in Salyan, Jajarkot, Surkhet and Dailekh districts.

Within the given altitude ranges, the yield of ginger increases with increased elevation up to 1600 masl and decrease yield at higher than this elevation. Seeds are planted on March-April and main crops are harvested from November-February depending on the market price and demand. However, during August-September the price is very high (Rs 25-40 per kg) and hence the farmers harvest parts of mother seeds which were planted on March-April. That is why, farmers use more seed (150-250 kg per ropani) as field store than actual required (80-100 kg per ropani). One special feature of ginger is that the seeds can be recovered after germination.

The average rhizome yield per ropani is about 600 kg but 1,000 to 1,300 kg per ropani is harvested in the higher altitudes. Parts of Surkhet, Salyan and Jajarkot under Chinchu – Jajarkot road corridor and parts of Dailekh and Surkhet under Surkhet-Dailekh road corridor are the suitable areas for ginger. Parts of Kalikot and Dailekh under Surkhet-Jumla road corridor are also the potential areas for the promotion of ginger farming. Malta area of Salyan district is known for fibreless ginger which is preferred for

making ginger powder. About 60 percent of total production of rhizome goes to India and 40 percent is consumed in Nepal through retailers. However, Terai and inner Terai are not suitable areas for ginger.

Use of poor quality seed (seed and disease borne), lack of crop rotation, flat planting system, inadequate crop nutrition, non-use of micronutrient and absence of seed treatment are the problems for low productivity. Addressing these problems will certainly raise the productivity from 600 kg now to 900 kg per ropani meaning that there is a yield gap of at least 300 kg per ropani because of inadequate package of practices. The yield gap has been proven by progressive farmers and Ginger Research Centre Kapurkot, Salyan District.

Description of actors and constraints faced by them

Seed Suppliers

- Kapurkot NARC research centre provides source/foundation seed for further multiplication
- DADO and NARC research centre select farmers as seed producers
- Farmers save their own seed rhizomes

Problems faced by these suppliers are

- High losses of seed rhizome (20-40%) in pits/stores
- NARC unable to produce large quantities of quality seed. They produce quality foundation seed.
- Seed produced by farmers are not healthy due to presence of rhizome rot.

Fresh ginger producers

- They are 80 percent small and poor farmers
- They are rain-fed bari-land farmers
- Ginger is the main source of cash income (Rs 8000 to Rs 18,000 per ropani)

Problems faced by these growers are:

- Unstable market and market price
- Storage problems both for seed and fresh rhizomes

- Rhizome rot is the danger disease
- Same price for graded and ungraded rhizomes
- Inadequate mulching materials
- Short crop rotation system i.e. 1 year rotation
- Inadequate use of organic manure and lack of using yield increasing technologies like humic and furic acid, amino acid, organic zyme manure, liquid organic potash and micro-nutrient due to unavailability.
- The wholesalers/collectors seldom pass on the benefit to farmers when prices go up in India but pay less when prices decline.

Collectors

- They are from local village, local market centre or even from District head quarter.
- They work on commission (5%) and also on credit for few days.
- They collect from farmers at market centre or at the collection centre for spices crop noticed in the project areas and send them to wholesalers at Surkhet or Nepalgunj.

The constraints faced by these collectors are

- Both clean and graded and ungraded rhizome received from different farmers.
- Product mixed with broken, wounded, rotten with soil without curing
- Standard size sack with fixed weight is lacking. This varies from farmer to farmer.

Wholesalers

- They are from Surkhet or Nepalgunj
- They have their own personnel mandi but not the common or corporate market centre.
- They are reasonably resourceful
- They sell on commission and sometime buy in fixed price from farmers and sell on their own price
- Generally price is determined by the demand of Indian markets
- They are also exporters to India and to others parts of Nepal like Bardiya, Bhairahawa etc.

These wholesalers' constraints are:

- They are high risk bearers due to frequent change in price. Increase or decrease price in India affects the price in Nepal
- Indian Government frequently changes the import policy from Nepal.
- Lack of storage technology in case when depressed price is offered by Indian importers.
- Value addition activities like branding, grading, packaging in suitable containers are lacking
- They receive ungraded rhizome. Simple grading is carried out by them. Hence, losses ranges from 15-20%. In fact, this loss is the loss of farmers because this loss is made up from the total quantity they receive from farmers.

Retailers

- They are small vegetable shop keeper and sell all kinds of vegetables and spices crops.
- Doke, foot pathe and Thelawala (push carts) also sell all the types of vegetable including spice crops.

- The retailers are small and poor but they are very honest. In hills, they are almost women (80%) but in Tarai there are men (70%).

Constraints faced by retailers are:

- Receive mixture of large, small size, different varieties, broken, rotten products which is difficult to sell (better rhizomes are exported)
- No choice from wholesalers
- There is big loss while grading (10-20%)
- Unseen losses of Doke (0.4%). Thelawala (5-10%), foot path retailer (5-10%) and vegetable shop (10-20%).

Consumer

- Average consumption per house hold ranges from 100-200 gm per week.
- Some consumer want thick rhizome having fibreless while others want thin rhizome with fibre cultivar. They say fibre variety is tasty and has long self life.

Exporters

- They are big business houses and export many agriculture products from Nepal to India including spices crops. They are stationed mainly at Nepalgunj.
- Indian importer stated that Nepal hill produced ginger, garlic and dry red chilly are very much preferred by Indian consumer due to unique taste compared to those produced in India.
- Indian administration is the main constraint for export. Their concerns are quarantine certificate, certificate of PRA organic and origin or production areas/site and import license. These are, however, ignored by Nepalese exporters and Indian importers.

District Agriculture Development Office

- They have little or no spices crop development programme.
- Sometimes, they manage to supply the foundation seeds received from Ginger Research Station, Kapurkot and other NAR station for further multiplication. In fact, they are used as commercial seed by the farmers and they do not save the seeds and distribute to the farmers.

The DADO also has some constraints and they are:

- They lack staff expert in spice crops.
- They have very little or no programme for spice crops and also lack budget

Ginger Research Station, Kapurkot

- The job of this station is to address the problems of ginger and transfer these technologies to ginger growers through DADO and NGOs.
- They also produce the foundation seeds of ginger and supply to ginger growers through DADO, NGO etc. for seed multiplication by farmers infarmers' field. However, production of foundation is in limited quantity due to lack of budget.

Processors

Ginger oil, dry rhizome, ginger powder, ginger candy etc. were produced successfully in Kapurkot and some NGO in Kapurkot and in Khairanitar, Pokhara but they are not commercialized due to lack of market promotion activities. A ginger powder production plant in Tulsipur, Dang is also closed due to competition with the large ginger trade houses.

Table 20: Selected Constraints and market based solutions for Ginger
Constraints Market based solution Service provider

Constraints	Market based solution	Service provider
<ul style="list-style-type: none"> Decreasing yield due to rhizome rot. Low yield due to poor crop husbandry practices Low price received Low yield due to non use of low cost yield increasing inputs Unorganized production and marketing system 	<ul style="list-style-type: none"> Provide training to farmers on seed selection, seed treatment and young plant treatment by Trichoderma followed by ridge/bed planting. Organize training on use of yield increasing inputs like micro nutrient, foliar nutrient application etc Introduce grading and curing activists at farmers level by training to improve value and price Demonstrate on the use of micro nutrient, liquid polish, zyme mal, amino acid in farmer's field. Improve producers group and market through producers co-operative 	<p>NARC, DADO, Agrovet, Co-operative</p> <p>NGO and Agrovet co-operative</p> <p>NGO, DADO Co-operative</p> <p>DADO, Co-operative, NGO, Agrovet producer group</p> <p>DADO and NGO</p>

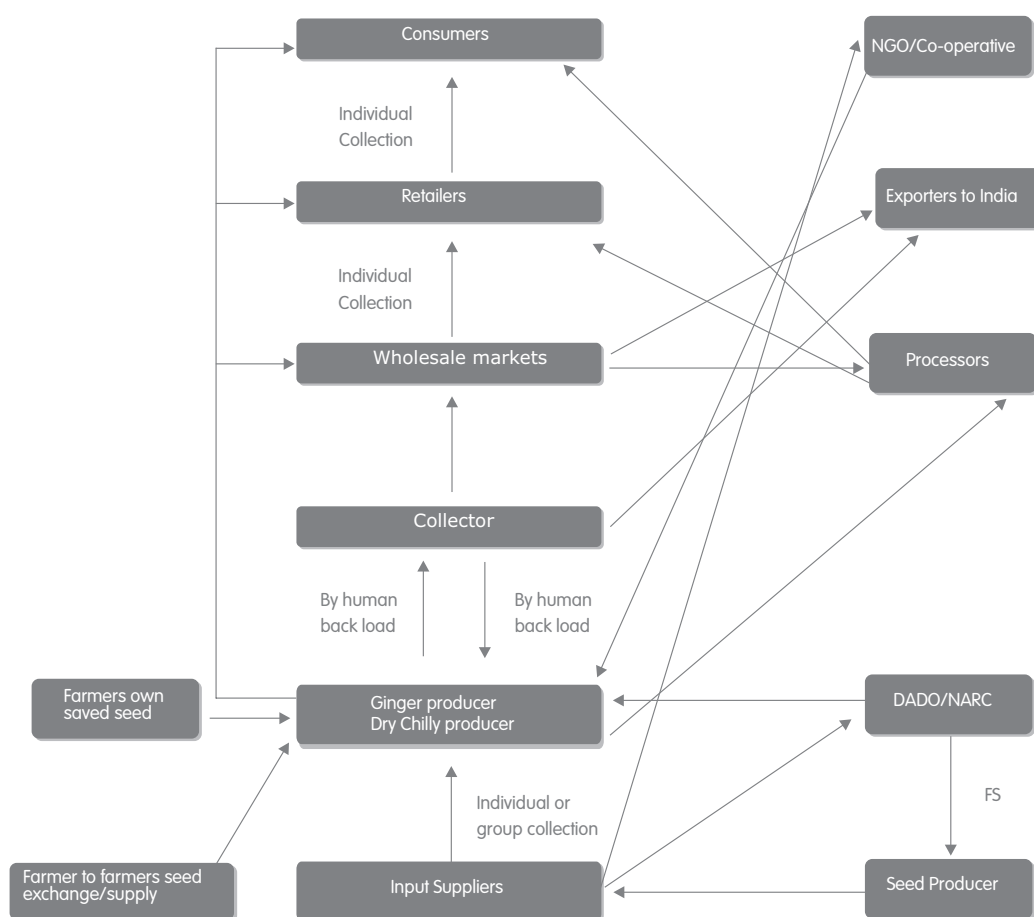


Figure 3: Common Value Chain Map for Spice Crops

4.6.7 GARLIC

Why the product is selected?

- Better cash crop for small farmers of high hills and mountains
- Export market to India particularly for Chinese variety which can be produced above 2,000 masl
- High domestic market of local cultivars produced in high hills and mountain areas
- Less perishable product

Introduction: The elevation of areas ranging from 2,000 to 3,000 masl is the best production areas for Chinese garlic variety and 1,300 to 2,600 masl for local cultivars. Western parts of Jajarkot and villages lying along Surkhet-Jumla road covering parts of Dailekh and Jumla are best suited for producing this crop. Because of less perishable nature and high value to volume, farmers can produce this crop no more remote areas where poor producers live. Crops are harvested in May-June

when weather is favourable and can be marketed as and when cash is needed. It has good keeping quality even in conventional storage system.

It has been observed that garlic and green onion powder are the important ingredients of most food industries in Nepal but unfortunately, the industries are importing small low quality bulbs from India. Hence, with better production organization and coordination with industries, this crop can become a huge import substituting product.

The average yield of garlic is 1,000 kg per ropani and Chinese variety can yield up to 1,500 kg. The price of Chinese garlic (Rs.38/kg) is also high compared to local garlic (Rs.25 at the collector's level. With these prices, the gross cash income per ropani works out to Rs.25,000 to Rs.35,000 at harvest time. If farmers can wait for another 2-3 months, the weight loss will be 5-10 percent but the price will go up by about 50 percent.

Initially, garlic farming is costly due to high seed rate (35 kg/ropani for local and 18 kg for Chinese) and high price of seeds (Rs.70/kg for Chinese and Rs.40/kg for local). But seeds can be saved at home for subsequent years and production cost will decline.

Thrips, mites, and pink disease are the minor problems and can be prevented with the use of inexpensive organic pesticides.

Actors and their Constraints

The actors involved in garlic and their problems are similar to that of ginger and hence only short description is made here.

Seed Suppliers

- Very difficult to get healthy Chinese and local cultivar foundation and seed for further production or multiplication of seed

Garlic growers

- Compelled to use their own seeds which are poor yields and least liked by exporter and domestic marketers.
- Lack of improved technology and marketing packages on garlic.
- Unorganized and scattered producers and production programme respectively.

Collectors

- Few numbers of collector due little quantity of production
- Big losses (20-30%) when they collect from grower, it not graded and cleaned.

Wholesalers

- They import well graded Chinese garlic from Khasa and export to India and also supply to domestic retail marketers because very little Chinese garlic is produced in Nepal (Dolakha and Lamjung Districts).

- They also market Nepal local garlic but they are poor in quality due to non-grading non-cleaning and non-drying well.
- High losses of local garlic (15-20%) and fewer losses (1-3%) of Chinese garlic in their go down.
- Wholesalers say there is a huge demand of Chinese and local large garlic in India provided they are produced and certificates of origin organic are made.

Retailers

- Local garlics are small and difficult to sell them while Chinese garlic is large and attractive and is very easy to sell.

Consumers

- They prefer largely Chinese garlic due to large size and easy to peel.
- They also like local garlic because of taste but they should be large but most of local garlic is 60-80 gm while Chinese garlic is 150 – 200 gm.
- Local garlic becomes unfilled/empty (sepro) inside cloves while Chinese garlic remains tight and weighty.

Exporters

- Lack of production of Chinese garlic cultivar and large size local cultivar for export
- About 800-1000 trucks of Chinese garlic is exported to India annually.
- It is about worth of 8,000 to 10,000 mt which is equivalent to 320 to 400 million rupees.

DADO, NARC and NGO

- These organizations have no programme on garlic from production to marketing and their promotional activists.
- Whatever is being done, it is entirely carried out by marketers.

Table 21: Selected Constraints and market based Solution for Garlic

Constraints	Market based solution	Service provider
<ul style="list-style-type: none"> • Lack of Chinese and local large bulb cultivar seed • Poor knowledge of farmers on market oriented production activities. • Lack of Government and NGO programme on garlic • Scattered production programme 	<ul style="list-style-type: none"> • Produce seed in farmers field with supports of DADO and marketers • Provide training to growers on production and marketing technologies • Include garlic programme policy by the Government and NGO • Organize farmers groups or co-operative on block production programme 	<p>DADO, NARC and wholesale marketers</p> <p>DADO, NARC and wholesale marketers</p> <p>DADO, DoA, NGO</p> <p>DADO, NARC</p>

4.6.8 DRY RED CHILLY

Why the product is selected?

- Import substitution crop hence huge domestic market
- High value cash crop
- Low cash requiring and least external input needing crop
- Women friendly crop.

Introduction: This is a cash crop for the small bari-land farmers who have no or little access of road for fresh market and also those farmers who have limited family members for daily transport of fresh vegetable to collection centre. Suitable areas are those having the altitude range from 700-1500 masl. It is also a semi-perishable commodity and can be marketed as and when needed by the farmers because it is not lost during the storage periods for 4-6 weeks in the store.

Red chilly means completely ripen rod fruits in the plant. They are harvested from Mid – August to October – November and dried in natural sun light when the days are clean and clear. It takes 4-7 days for drying. 3-4 kg of fresh red chilly gives one kg of dry chilly which is sold at Rs 80 – Rs 100 per kg.

They yield of marketable dry red chilly per ropani ranges from 200 kg to 200 kg, which gives about Rs 16,000 to Rs 24,000 within 120 days of farming from mid-June to mid – October. The yield and cash income can be further increased with the use of appropriate variety and good husbandry practice. Similarly, use of low cost solar dries with further enhances the cash income through development of bright red colour by receiving high price for high quality product.

Parts of Salyan and Jajarkot Districts within Chhinchu-Jajarkot, parts of Dailekh under Surkhet-Dailekh road corridor and parts of Dailekh under Surkhet-Jumla road corridor are the appropriate areas for cultivation of this crop.

Thrips, mite and Virus are the missing problems which can be kept under control through use of virus tolerance variety and use of insecticides.

Actors and their constraints

Description of each actor involved in ginger are made in ginger sub-chapter, since, same actors are also involved in dry red hot chilly, it is, therefore, is not repeated here. The constraints faced these actor in dry red chilly are described.

Seed and other input suppliers

- Mostly (80-90%) local seeds of local cultivar saved by farmers themselves are used. They are low yields and virus disease susceptible.
- Difficult to motivate the farmers to use improve high yielding and disease tolerance cultivates.

- Poor linkages of agrovets to chilly growers.

Dry red chilly growers

- Inadequate knowledge and skills on growing and processing of red chilly.
- Poor access to income yield and quality enhancing production and marketing technology and information
- Scattered and unorganized production programme
- Poor linkages to input supplier and dry red chilly buyers.

Collectors

- Low scale of production
- Variation in quality from farmers to farm in terms of length, dryness and deep red colour.
- Mostly dry chillies are without pedicel means without Bhetho.
- Sometime dry chills are hollow without seeds. It is losses to farmers because it contributes for low weight.

Wholesalers

- They are importer and exporter of dry red chilly.
- Limited production for export through there is huge Indian markets.
- Every year importers import worth of 350 to 400 million Rupees dry red chill from India.
- However, hills produced dry red chilly produced in hills is really red and excellent quality compared to red chilly imported from India - said one chilly importer from India at Kalimati wholesale market.

Retailers

- Indian chilly are poor in quality and are difficult sell and Nepal produced chilly is always short supply.

Processor

- They are dust maker and use more than 90% of Indian red chillies
- They are mixtures of colour like light red, brown and dark red which spoil the quality of dust.
- Indian dry red chilly are less pungent and least preferred by consumers so they mix very expensive Akabare Khursani which is very pungent and price is also very high Rs 350-400 kg. It dry Akabare Khursani, while that of non-Akabare is Rs 80-Rs 90 per kg
- It is thus production cost becomes high and difficult to compete in the market.

Consumers

- Non-pungent and less attractive colour
- Dry red chilly dust are also of poor quality
- Hence, they are shifting to Akabare Khursani for pungency purpose.

DADO, NGO, NARC

- The involvement of this organization is almost non-existent.

Table 22: Selected Constraints and their market based Solution for Dry Red Chilly

Constraints	Market based solution	Service provider
<ul style="list-style-type: none"> Lack of dry red chilly variety used by growers Inadequate use of inexpensive market based production technologies Unorganized farmers and their production and marketing programme Low production and low productivity 	<ul style="list-style-type: none"> Organize field training and demonstration Provide training on full package of market based production technologies Manage and organize farmers through group or co-operative mobilization for production and marketing Introduce promotional activist on production and marketing of dry red chilly i.e. farmers visit programme at production areas and market centre, broad casting through TV channel, FM, radio, press conference etc. 	<p>DADO, NGO and marketers DADO, NARC markets , NGO</p> <p>DADO, NGO marketer</p> <p>DADO, NGO marketer</p>

4.6.9 OFF-SEASON ONION

Why the Product is selected?

- Import substitution crop and hence has high domestic market and is helpful for reducing import and money drained to India.
- High cash generating crop and has large expansion potential in benefiting large number of small and poor bari land farmers.

Introduction: August to mid-March are the off-season months of onion bulbs in Nepal due to unavailability of normal season onion bulb produced in Nepal during April to May. The unavailability of these onions from August is mainly due to rotting, sprouting and rooting at store. It is reported that 40C to 270C is the most suitable temperature for these losses and above 280C and below 30C is suitable temperature for storage. However, storing above 270C will cause losses in weight by shrinkage and transpiration and storing below 40C causes tasteless and sweet and browning in internal scale of bulbs which is the edible part of onion.

During these periods onion bulbs worth little more than three billion rupees are imported from Nasik, India which is about 1100 km away from Nepal. If this sum goes to 50,000 small farmers who will grow off-season onion in Karnali area each farmer could earn about Rs 40,000 within 70-75 days with production carried out during June to September. It is possible that with this cash income, poverty of these poor onion farmers will be reduced quickly.

Production of onion bulbs from July to October months can reduce this import which can be easily produced from Tarai to mountain areas. However, yield and quality are far better in hills and mountains than those produced in Tarai. It is semi-perishable commodity and is well suited to bari land under

rain-fed condition. The marketable bulb yield per ropani ranges from 1,500 kg to 2,000 kg which is equivalent to Rs 22,500 to Rs 30,000 within 70-75 days. Losses in onion are not high (5-10%) even if they are not sold for a week or two weeks.

Chhinchu-Jajarkot road corridor which covers parts of Surkhet, Salyan and Jajarkot and lies in altitudes ranging from 700 to 2,200 masl within 3-5 km of road heads are suitable areas for this crops. Similarly, Surkhet-Jumla Corridor which covers parts of Dailekh, Achham, Kalikot and Jumla are also equally suitable for off-season product. There are very few field problems which can be easily solved and these problems are:

- Mites, pink disease and tip burn are the insect pest, fungal disease and zinc and other micronutrient deficiency are the problems. These can be corrected through use of miticide, fungicide and micronutrient which are available in the market.
- Difficult to raise seedling due to monsoon rain. Protection of nursery bed by white plastic tunnel will minimize the problem.
- Weeding is the main expensive operation in onion farming. To reduce cost, inexpensive organic weedicides (Turga super and jarson), which are available in the market, can be used.
- Off-season onion variety seed (off-season onion – 1) is difficult to get in time. Timely seed management through retailers is necessary.
- It is a labour intensive crop and, therefore, should not be promoted where labour supply is a problem.

Actors and constraints faced by them

Input wholesalers

- They are importers of inputs and also the collector of locally produced seed and other inputs.

- They are located at Kathmandu, Butwal and other large cities. They have good linkages with international suppliers including India.
- They have good networks with retailers and mostly they give products on credit for up to six months.
- Off-season onion seed is fully imported from India. At the time when Nepal needs the seed, the seeds are old (i.e. previous year's seed) because new harvest is yet due. Due to this reason, the seeds are of poor quality with low germination percentage. This must be considered as an opportunity to produce seeds in Nepal itself which can benefit many farmers.

Local input suppliers

- They are agrovets, co-operative and producer groups. They are small business entrepreneurs. They are not experienced and lack know-how on off-season onion. They receive inputs from wholesaler and growers complained that they receive poor quality seed and other inputs.
- They have poor linkages with farmer, wholesalers and collectors
- They are financially weak and financial institutions are reluctant to finance them.

Onion farmers

- Inputs including seeds are not available in time and even if available, are poor in quality.
- Farmers reported that poor cash income is due to poor productivity which is also contributed by inadequate and poor quality inputs, like expired and oral inputs.
- They lack know-how on the use of yield improving low cost technologies like use of multi micro and macro liquid fertilizers, organic weedicides, amino acid and enzyme based liquid nutrients.
- They are unaware about curing grading and cleaning as value addition measures before marketing. This causes loss of 15-25% due to low price for ungraded onion.

Output collector

- Both private farmers and the agents of wholesalers serve as collectors. They work on commission basis usually ranging from 2-5% of the total onion and others vegetable collected. They buy on credit because farmers trust them. They pay back when they receive money from wholesalers at mandi. The problems faced by them are:
- Small collection centre hence has limited space.
- Unreliable and inappropriate transport system which increases the losses by 5-10%

- Main road and link road to production areas are worst during the rainy season when onion and others off-season vegetable have peak season.

Output wholesalers

They are also importers and exporters of onion and vegetables. They are stationed at Surkhet and Nepalgunj mandi. They have good networks with retailers within the city and also have good linkages with wholesalers at Butwal, Narayanghat etc. These wholesalers sell on commission basis at 7% or they take Rs 2 – Rs 4 per kg. But if they bring by themselves or by their own collectors they sell at 30-40% of purchase price from growers at collection centre. The major problems faced by them are

- Small mandi with limited space.
- Unclean and ungraded onion received. Similarly shape, size, colour and taste sought by the market and consumers are not received. i.e. round shaped, 80-100 gram weight with red colour and sweet taste are the choice of the consumers
- Receive very little quantity from producers and has to import from India which is also not easy.

Retailers

They are small poor men or poor women. They have little fund for business. They stated that onion is least rotted hence, safe to sell. Women are common in the hills as doke.

- Retailers are the only graders and cleaners in whole vegetable business because they are directly in contact with buyers. If vegetables do not look fresh and attractive, it is very difficult to sell. While grading the losses range from 5-10% but it is compensated by selling at high price of graded onion.
- As retailers they want many kinds of fresh vegetable and sometimes, it is not available from then wholesalers.

Consumers

They are rich, medium and poor consumers having different quantity demand for consumption. While richer consumers buy onion in sacks, the common consumers buy for a maximum of one week's supply (about 1 kg). There is 5-6% weight loss when stored for a week.

Problem of consumer are as follows:

- Small size if bulb (100-120 gm) and round and desirable road colour are not available.
- Mostly ungraded and unclean onions are available for buying.
- Suspicion about chemical pesticides used in onion during production and storage.
- Price of onion is high seldom dropping below Rs.20 per kg.

Table 23: Selected constraints and market based solutions for Onion

Constraints	Market based solution	Service provider
<ul style="list-style-type: none"> Lack of improved onion farming practice. Inputs mainly seeds are not available in time 	<ul style="list-style-type: none"> Provide training to farmers and agrovets and co-operative Organize meeting between onion farmer snaps, Agrovets and wholesalers in January-February to finalize the supply and demand of seed and others inputs 	DADO and NARC wholesales, Agrovets and farmer groups
<ul style="list-style-type: none"> High losses from production to retailing 	<ul style="list-style-type: none"> Provide training to farmers and marketers on grading, cleaning and packing 	DADO, NGO, Co-operative NARC
<ul style="list-style-type: none"> Lack of collection centre if there are, they are small and mandi/wholesale market small. 	<ul style="list-style-type: none"> Establish large collection centre at road head of production areas and link to large wholesale market centre at Surkhet 	DDC,DADO,INGO
<ul style="list-style-type: none"> Lack of potential activity or off-season onion farming 	<ul style="list-style-type: none"> Utilize TV channels, FM and press conference and publication for promotion 	DOA, DADO, INGO, NGO

SUPPLEMENTARY INFORMATION FOR VALUE CHAIN MAP

Table 24: Mean yield and gross income per Ropani

Commodity	Yield (Kg) per ropani	Gross income (Rs) per ropani	Production Cost (Rs) per ropani	Gross margin(Rs) per ropani
Tomato	1500 – 2000	22500 – 30000	10000	12500-20000
Onion	1500-2000	22500-30000	10000	12500-20000
Cabbage	2500-3500	20000-28000	8500	11500-19500
Cauliflower	700-1000	21000-30000	10000	11000-20000
Green hot chilly	700-1000	15000-20000	7500	7500-12500
Green bean	800-1200	20000-24000	8000	12000-16000
Green pea	500-700	20000-30000	9000	11000-21000
Carrot	800-1000	24000-40000	10500	13500-29500
Radish	1500-2000	16000-24000	4000	12000-20000
Ginger	600-800	8000-10000	3500	4500-6500
Dry red hot chilly	200-300	16000-24000	6000	10000-18000
Garlic	1000-1500	25000-35000	9500	15500-25500
Apple	1650-2200	25000-33000	11000	14000-22000
Orange	1200-1600	14625-28500	7500	7125-21000
Mango	500-1000	8050-15000	4500	3550-10500
Walnut	170-190	14400-19600	3000	11400-16600

Ropnai.(5,476 sq. ft.) is a local measure of land and one ropani is equal to 0.05 hectare

Table 25: Mean losses (%) of commodities at different stages

Commodity	Growers field	Transport	Wholesale market	Retail market	Consumer store
Tomato	15	10	15	25	2
Onion	15	0	10	5	0
Cabbage	20	10	15	20	1
Cauliflower	20	15	10	15	3
Green hot chilly	15	5	10	20	0.5
Green bean	15	5	10	15	1
Green pea	15	5	10	15	2
Carrot	20	5	10	15	1
Radish	20	5	10	15	1
Ginger	15	2	10	15	0
Dry red hot chilly	15	2	5	5	0
Garlic	15	2	10	10	0
Apple	25	15	15	25	3
Orange	20	10	10	15	2
Mango	20	10	5	20	5
Walnut	15	0	5	10	0

CAUSES OF LOSSES

1. Major uncontrollable (exogenous) loss of fruits, spice crops, vegetables and NTFPs in the study area occurs during the production due to hailstones. The hailstone cycle in the study area is about 5 years – i.e. the annual probability of 20 percent. When hailstone calamity occurs, the loss to various HVA products and NTFPs varies by product. In open fields, the annual probability of losses are 6 percent for apple, orange and mango, 2 percent for walnut, 6 percent for tomato, 8 percent for cabbage, 3 percent for spice crops and about 2 percent for NTFPs. The high value vegetables can be grown in plastic houses to save from hailstones and other inclement weather situations.
2. Losses from growers' field to wholesale markets are the losses of growers
3. Losses at retail markets/shops are the losses of retailers
4. Causes of losses in growers field
 - Disease insect pests and poor nutrition supply problems
 - Over mature and immature harvest
 - In appropriate cultural practices like pruning, training, watering, weeding etc.
 - Use of wrong cultivar
 - Non-practice of grading and cleaning
5. Causes of losses during transportation
 - In appropriate packing containers.
 - Lack of protecting layers between vegetables i.e. waste newspaper/ dry straw/ broad leaves etc
 - Incorrect methods of loading and unloading due to heavy weight vegetable containers
 - Wrong transport system
6. Causes of losses at wholesale market
 - Physical and physiological weight losses
 - Rotten/broken/damaged etc
 - Ungraded and unclean
7. Causes of losses at retailer shops
 - Weight and freshness losses
 - Unsold losses
 - Ungraded losses
8. Causes of losses at consumers kitchen
 - Rotten and presence of inedible parts

Table 26: Choice of vegetable type/cultivar of different actors

Crop	Quality	Grower	Marketers	Consumers
1. Tomato	Size	Any but productive variety	Large (800 – 1000 gm) fruit	Large (80-100 gm) and small 30 – 50 gm with sweet and sour taste
	Shape	Any but productive variety,	Ovate-oblong	Ovate-oblong
	Colour	Red at harvest	Turning colour	50% colour
	Skin	Any but productive variety	Thick (1.5 – 2 cm)	Thick for large, thin for small
	Self-life	High (7-10 days)	High (10 – 15)	Medium (3 – 4 days)
2. Onion	Taste	Any	Sweet and sour	Sweet and sour
	Size	Large (above 150 gm)	100 – 125 gm	100 – 125 gm
	Colour	Dark red	Dark red	Dark red
	Shape	Any	Round	Flat
	Self-life	45 – 60 days	15 – 20 days	7 – 15 days
3. Bean	Taste	Any	Pungent	Sweet and less pungent
	Size	60 – 75 cm long	60 – 75 cm long	60 – 75 cm long
	Shape	Round	Round	Round
	Colour	Any	Light green	Light green
	Self-life	Any	7-8 days	2-4 days
4. Cabbage	Size	Large (2-4 kg)	0.5-1 kg	0.5-1 kg
	Shape	Any	Round head	Round head
	Colour	Any	Dark green	Dark Green
	Self-life	Any	7-10 days	3-5 days
	Size	Large (2-4 kg)	0.2 – 0.5 kg	0.2 – 0.5 kg
5. Cauliflower	Shape	Any	Round	Round
	Colour	White	Snow white	Snow white
	Self-life	Any	7-10 days	3-5 days
	Size	Any length	14-20 cm	Any
	Shape	Any	Round	Round
6. Green chillies	Colour	Any	Dark green	Dark green
	Self-life	2 days	7-10 days	7-10 days
	Taste	Any	High pungency	High pungency
	Size	8-12 cm long pod	8-12 cm long pod	8-12 cm long pod
	Shape	Any	Thin and round	Thin round with 7-10 gram
7. Green pea	Colour	Any	Dark green	Dark green
	Self-life	Any	7-8 days	2 – 3 days
	Taste	Any	Sweet	Sweet
	Size	Large	15 cm long	15-20 cm long
	Shape	Any	Non tapering root	Non tapering root
8. Carrot	Colour	Bright orange	Bright orange not hairy root	Bright orange not hairy root
	Self-life	10-15 days	8-12 days	3-5 days
	Taste	Sweet and juicy	Sweet and juicy	Sweet and juicy
	Size	Large and long	15-35 cm long	15-35 cm long
	Shape	Uniform from top to bottom	Uniform from top to bottom	Uniform from top to bottom
9. Radish	Colour	White	Green neck with white	Green neck with white
	Self-life	2-3 days	7-8 days	3-5 days
	Taste	Any	Sweet non pungent and Juicy	Sweet non punk and juicy and Juicy
	Size	Large	large (150-200 gm)	Large (150-200 gm)
	Shape	Any	Bell with 4 lobes	Bell with 4 lobes
10. Capsicum (Sweet peppers)	Colour	Any	Dark green, yellow, red	Dark green, yellow, red
	Self-life	2-3 days	7-8 days	3-4 days
	Taste	Any	Sweet	Sweet

Table 27: Choice of spices type by different actors

Crop	Quality	Grower	Marketers	Consumers
1. Ginger	Size Shape Skin colour Self life Taste	Large Thick ginger Any High Natural	Large Thick ginger Bright brown High Natural	Large Thick ginger Bright brown High Natural
2. Garlic	Size Shape Skin colour Self life Taste	100 gm Round White Long Pungent	100 gm Round White 3 months Pungent	50-100 gm Round White 3-4 months Pungent
3. Dry red hot chilly	Size Shape Skin colour Self life Taste	Any Long Red 30 days Hot	6-10 cm Long and smooth Dark red 90 days Hot	6-10 cm Long and smooth Dark red 15 days Hot

Table 28: Choice of fruit type of different actors

Crop	Quality	Grower	Marketers	Consumers
1. Apple	Size Shape Skin colour Self life Taste	150-200 gm Round Red 5-7 days Sweety	100-200 Round Red 10-15 days Sweety	100 gm Round Red 5-7 days Sweety
2. Walnut	Size Shape Skin colour Self life Taste	30-40 gm Any White clean Long Nature	20-30 gm Round Brown clean Long Nature	20-30 gm Round Brown clean Long Nature
3. Orange	Size Shape Skin colour Self life Taste	150 gm Any Any 7 days Sweet	100 gm Round Tight skin dark orange 7 days Sweet	80-100 gm Round Tight, thin skin 3-5 Sweet

Table 29: Potential Value Chain demand in Mid Western and Far Western Development Region

Value chain	Present production(Ton)	Potential market demand		
		Domestic	Export	Total demand(Ton)
Tomato	3600	4800	30000	34800
Onion	85	7200		7200
Green Chilly	24	720	3000	3720
Green bean	160	2400	22500	24900
Green pea	10	1196	22500	23696
Cabbage	2500	6000	33750	39750
Cauliflower	1500	1200	22500	23700
Carrot	60	600	10500	11100
Radish	300	6000	21000	27000
Ginger	52704	4480	60000	64480
Dry red hot Chilly	30	80	750	830
Garlic	115	2240	60000	62240
Apple	4200	23040	48000	71040
Walnut	1373	5760	27000	32760
Orange	5254	34560	108000	142560
Mango	1867	5760	1800	7560
Total		106036	471300	577336

Note:

- Present production means the arrival of producer at Surkhet and Nepalgunj Whole sale markets or mandi.
- Domestic demands is the demands of Consumers at Cities of mid-western and far-western regions. The data are the results of the discussion by the team members with the Wholesalers , or mandiwala and Consumers;

Similarly potential demands for export market is the demands of U.P. and Uttaranchal Pradesh. The total population is estimated at 150 million. In our case, we worked out 15% of the total population are the Consumers of three road corridors of the mainly Karnali high way.

Table 30: Areas (hectare) required for production of given Quantities of value chain in Karnali high way corridors.

Value chain	Required areas for population market demand		Total
	Domestic	Export	
Off-season tomato	320	2000	2320
Off-season onion	480		480
Off-season green chilly	72	300	372
Off-season green bean	300	2813	3113
Off-season green pea	149	2813	2962
Off-season cabbage	300	1688	1988
Off-season cauliflower	120	2250	2370
Off-season carrot	40	700	740
Off-season radish	400	1400	1800
Ginger	374	5000	5374
Dry red hot chilies	20	188	208
Garlic	150	4000	4150
Apple	1536	3200	4736
Walnut	570	2700	3270
Orange	3455	10800	14255
Mango	576	180	756
Total	8862	40032	48894

Table 31: Price per kg in Rs of different value chains at different market chains

Value chain	Farmers price	Wholesale price	Retail price
Tomato big	18	20	25-30
Tomato small	10	12	15-16
Onion bulb	18	22	30
Green chilies	20	25	35
Green bean	16	20	30
Green pea	35	45	55-60
Cabbage	6-7	8	12
Cauliflower	35	40	50
Carrot	45	50	60
Radish	16-18	20	25
Ginger new (Sep harvest)	45	50	65
Ginger (Dec harvest)	10	12	16
Dry hot chilies	95-100	108	130
Garlic (Chinese)	32-33	35	50
Garlic (local)	25	30	40
Apple (Indian)	20	45	60
Apple (Chinese)	15	45	60
Apple (Nepali)	15	30	50
Orange (Nepali)	16	25	30-35
Orange (Indian)	15	30-40	60-65
Mango	20-30	40-50	60

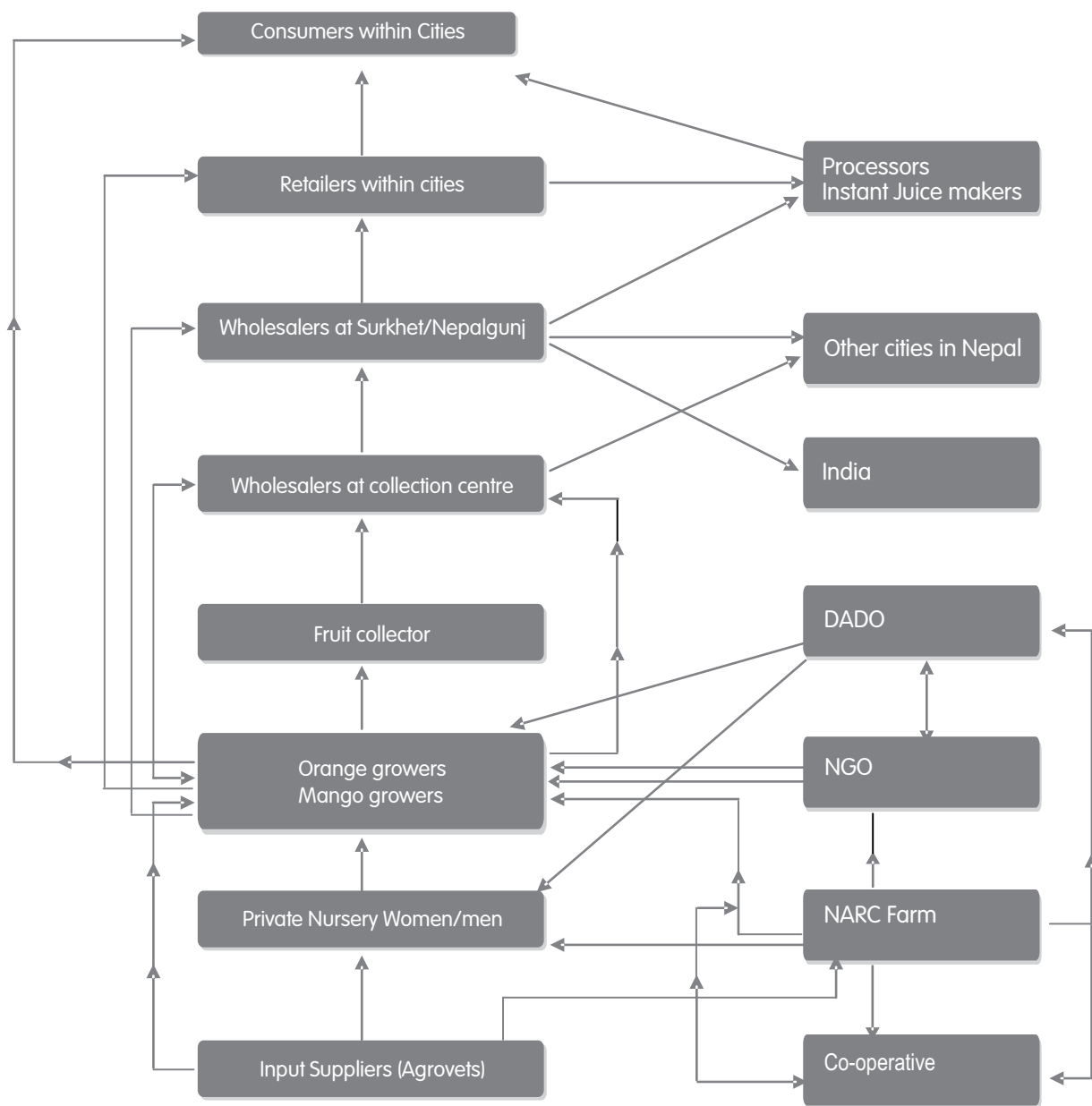


Figure 4: Value Chain Map of Orange and Mango.

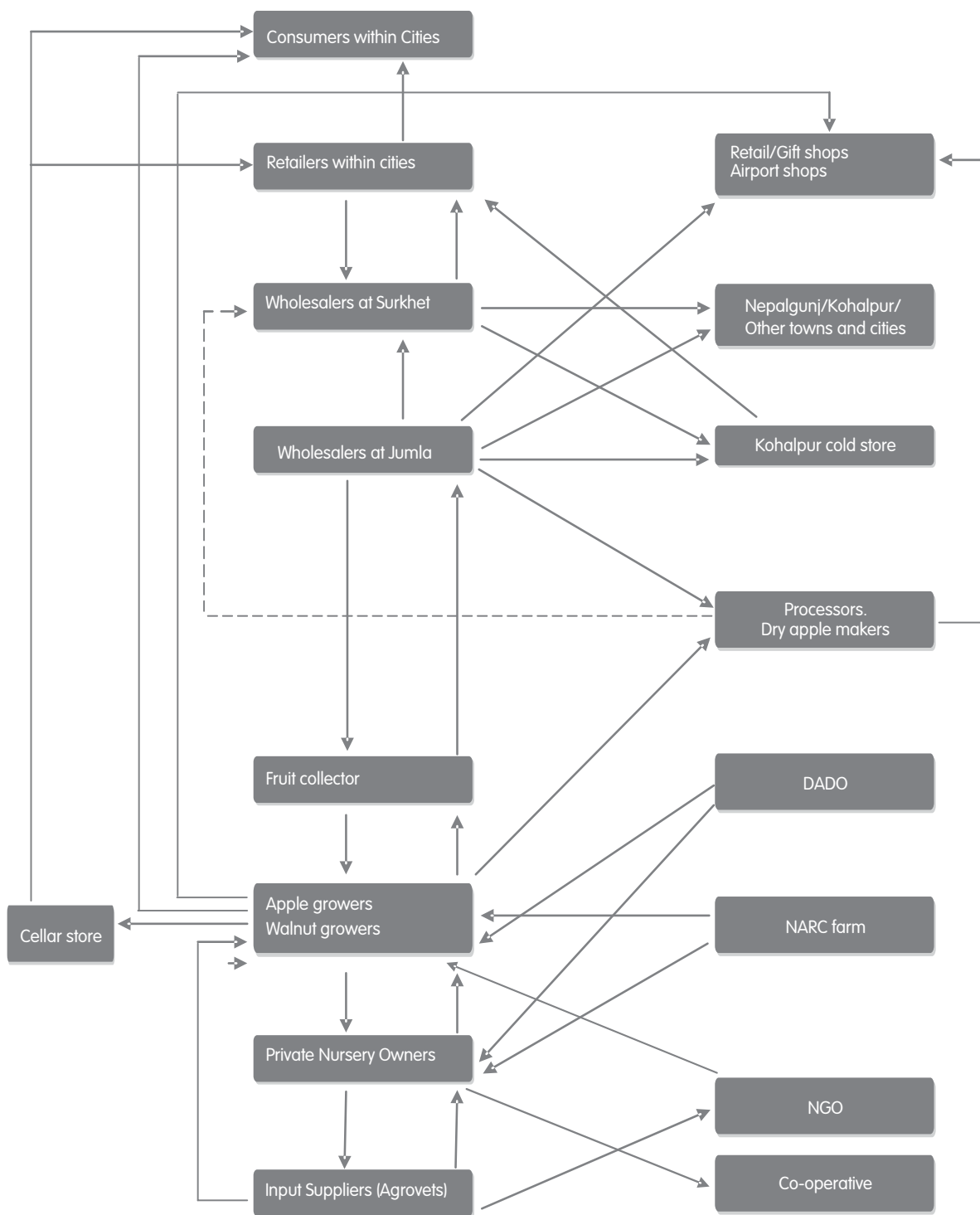


Figure 5: Value Chain Map of Apple and Walnut

4.6.10 APPLE

Why the product is selected?

- Import substitution crop, hence has enormous domestic market.
- Potential for export to Northern India and Bangladesh.
- High cash generating crop compared to other crops within similar climatic areas.
- Participation of large number of farmers which include all ethnic groups.

Introduction: Apple is the important temperate crop which needs high chilling (5-7°C for 700-1,000 hours) for flowering and fruiting. Similarly, absence of cloud and heavy rain from fruiting to harvesting increases the quality and marketability of apple. These climatic parameters are almost available at Jumla, parts of Kalikot, Mugu and Dolpa and these areas are suitable for these crop. Delicious variety groups of Apple are successfully grown on altitude ranges of 2,000 to 2,800 masl.

Apple is perennial fruit crop and lives many years unless they are damaged by disease, pest and natural disaster like heavy snow or wind. It bears fruit from 5 years after planting and becomes commercial from 10th year onwards. The grafted seedlings are planted during winter and they are trained and pruned in every winter months. Fruits are harvested from July (early variety) to October (late variety), however, October is the peak month for apple harvest.

A well managed 10 year old red delicious variety produces about 110 kg fruit (770 fruit number) per tree. One ropani of land accommodates 15-20 trees which produce 1,650 kg to 2,200 kg fruit. This quantity gives about Rs 25,000 to Rs 33,000 gross income per ropani per year. If a farmer seriously manages 3 ropani apple orchard which is commonly found at Jumla, Kalikot, Mugu, Humla and Dolpa, the annual gross income per household will be Rs 75,000 to Rs 165,000. This income will be very helpful for reducing their family poverty.

It has been observed that apple fruits worth about Rs 50 crore from China and about Rs 40 crore worth from India were imported during 2007/08 (communication with apple wholesalers/importers). If this amount can go to the pockets of Karnali farmers, they will not remain hungry as is often observed at present.

Two VDCs of Kalikot close to Jumla (Phoimahadev and Rachuli) and all the VDCs of Jumla, Dolpa and parts of Mugu Districts (which will have road in future because it is under construction) are the potential and suitable areas for promotion of apple farming under Surkhet-Jumla roads and its link road to Mugu, Dolpa and also within the District link road corridor. Jumla is the main district in the

study area for apples as it is grown in all 30 VDCs. Apple began in Jumla from as early as 1968 when 73,000 apple saplings were brought from Kashmir, India.

Moisture stress from flowering to fruiting, macro and micro nutrient deficiency, scars and papery bone diseases, wooly aphids and Sanjo scale insect pests are problem faced by the apple growers at Jumla. Addressing these constraints will increase income of apple farmers.

The improvement is easy to achieve due to availability of low cost technologies in Nepal. For example use of Bejod liquid fertilizer (20:20:20) + crystal + micronutrient + amino acid) will correct all nutrient deficiency of apple. Application thorough sprayer for 3 times costs Rs 40.0 per plant which will be the value of 3 kg apple only.

Similarly, growing of local beans around each plant up to flowering stage and incorporating them in the soil as green manure (cutting plants and turning them into the soil) will supply the plants with major nutrients and organic matter. Five kg of such green bio-mass will supply 250 gm Nitrogen which is the required amount of Nitrogen for bearing trees of 8-10 years. Inoculation of Rhizobium through seed treatment will further enhance Nitrogen fixation of the plants.

Actor's description and Constraints faced by them

Nursery man/women

- Grafted apple seedlings are produced by trained nursery owners and are supplied to apple growers through DADO, Co-operative and NGO. Some growers also directly collect the seedling from the nursery.
- There are 32 nursery owners in Jumla District and all are not equally experienced and trained. Similarly, all are not serious, devoted and sincere.
- They all are small and are also poor. Their technical know how is also poor despite several sessions of training.
- Similarly, grafted apple seedlings are also produced by Horticulture Research station, Jumla and they are distributed through various agencies. Some farmers collect the seedlings directly from this farm. The quality is good and reliable. The constraints faced by these nursery are as follows:
 - Small nursery area and small production due to their poorness.
 - Nursery management is poor in terms weeding, feeding, raising root stock and grafted seedling, watering and manuring.
 - High demanding varieties and other plants to be used as scion during grafting are not adequate.
 - Receive poor technical support and supervision from the concerned Government agencies.

- Receive or collect less quantity of root stock seeds (crab apple and Bdi apple seeds) for raising root-stock seedlings
- Clonal root stocks like M27, M9, MM104 etc are also lacking which are necessary for Jumla condition.
- The nurseries look like one man/woman ownership due to lack of untrained family members and also absence of skill labour for nursery.
- Basic needs of nursery like shade house for grafting, water collection tank or pond for irrigation, well protected nursery bed for small seedlings, top soils from uncultivated raising root-stock seedlings etc are almost lacking or inadequate.
- Private sector apple sapling price is Rs.20 per sapling but it is being sold by ADO in Rs.2 but only limited sales of about 20,000 saplings. Such quota-based subsidy from the government is discouraging the private sector investment in input supply. BDS program of Winrock provided sample of very handy and easy prototype apple and other fruits harvesting bag and the private sector wanted to produce it but because of quota subsidy of DADO, private sector could not do it.

Apple growers

- There are 1,450 hectares of lands under apple producing 3,500 mt apple in Jumla and Kalikot. Similarly, there are 309 compact apple planters in Jumla. There are 7 big apple producers in Jumla (Padam B. Mahat, Mun B. Bishta, Nilkantha Shahi, Ram Krishna Budhathapa, Ram Krishna Chaulagai, Krishna B. Shahi) with more than 400 apple trees per farm.
- These apple growers are small land holders and poor. Average apple tree per household is 25 of which 70 percent are bearing.
- The Dalit and Janajati farmers who are very poor are also growing apple.
- They are rain-fed bari-land farmers and food is always the unending problem.

The major constraints faced by apple growers are:

- Low productivity of apple tree and under sized and unmarketable fruits are produced due to lack of annual pruning, training, manuring, mulching, plant protection and post harvest activities. It appears that trees are under-cared and under-fed. Plants are weak and sickly.
- Lack of technical know how and skills of farmers on commercial apple farming.
- Under or no use of local resources for improving apple productivity and quality. These are green manuring in sites, green leaves manuring, local production and use of liquid organic manure (Jhol mal)
- In the past, seedlings provided were of mixture of even unknown varieties and now the results are that many fruits are less attractive to the

marketers. They can be improved by top work with desired variety.

- Trees are declining now due to scab, papery base, woolly aphids, Sanjos scale. It is still not in danger state and can be easily corrected by the use of integrated plant improvement measures.
- Lack of promotion of low cost storage to prolong the life of fruits thereby increasing cash income.
- Use of wrong harvesting methods and system of harvesting immature fruit.
- Poor access to technical assistance mainly to Dalit and Janajati who are poor and small.
- Storage facilities are poor. Pit storage is found successful in minimising evaporation loss but some mould growth could not be avoided despite KMS dipping and digestive spray.

Collectors

In practice, collectors in this crop are non-existent except few men and women collecting the apple fruits from relatively large orchards and supply to retailers and doke farmers who mostly sell these at the airport.

To date there is no any organized collection centre in apple growing areas. However, recently, on the roads head of Surkhet – Jumla road at small villages or hotel areas, collectors brings fruit from the top villages and sell them directly to buyers. In future, these road head small villages may become the collection centres.

Wholesalers

- The organized wholesalers are also lacking for apple and other temperate fruits in Karnali zone. However, some people collect fruits directly from producers and send them to Surkhet small mandi through the air and sometimes through bus and trucks.
- In fact in apple and others fruit crops, where the production areas are very far from big cities, two types of wholesalers or wholesale markets will need to be established; one at Jumla and other at Surkhet. When large quantities of apple will be produced, the two tier system will be certainly in operation.
- The fruits received by wholesalers at Surkhet were ungraded and uncleaned but still are sold due to freshness and cheaper than apples from China and India.
- There is very little support from growers to wholesalers because growers want to sell all the fruits in the orchard at high price including those that are not marketable for table use.
- In view of growing enterprise a good plan of collection centre at road heads and excellent large market centre/wholesale market at Jumla which can also be used for off-season vegetable should be made.
- Currently, financially supported by the Government on transport cost looks good but if it is continued for long time it will be suicidal

for apple business because all the private entrepreneurs will show their least interest because they cannot compete with Government supported entrepreneurs.

Retailers

- There are large number of retailers in Jumla and Surkhet.
- Those who have no apple orchard, they go to orchard, collect and sell them at airport, footpath of Jumla.
- Similarly, orchard owners themselves bring the fruits at above described places and sell them to consumers directly.
- While in Surkhet, Thelawala, doke or fruit shops collect fruit from wholesalers and sell them to consumers, in Nepalgunj Thelawala and retails shops collect from wholesalers and sell to consumers.
- Jumla apples, although not attractive, they are tasty cheaper and fresh compared to Indian apples. Hence, it is liked by the consumers.
- The apples are not regularly supplied even in peak season.
- They receive non-graded and uncleaned fruit, so there is loss (10-15%). Neither producer nor wholesaler grade the fruits.
- Receive mixture of different kinds of fruits. Mature, over mature, immature, delicious and non-delicious varieties fruits.

Consumers

- Jumla apples are accepted by consumers because they are small (80 gm) to medium (100 – 120 gm) size compared to Indian and Chinese apples which are large size (100-200 gm) found in market but very small size are unacceptable.
- But mixed fruits of different varieties are the problem. Non-delicious fruits should not be sent to Surkhet and Nepalgunj markets.
- Irregular supply is another problem even during the season. Regularity can be ensured provided wholesalers from Surkhet or Nepalgunj store the fruits in cold storage at Kohalpur. The 2,500 mt cold storage at Kohalpur, which is storing table potato, seed potato and Chinese apples, is planning to extend another 1,250 mt section exclusively for Karnali apples in the near future.

Processors

- Apples in the study districts are processed to 10% chips, 20% alcohol, 2% jam jelly, and 2% others. Rest is sold fresh. However, the processed products are not commercialized except apple Sukuti (chips) which has created the market.
- The constraints of Sukuti (chips) producers are as follows:
 - Red delicious varieties fruits of good qualities are the best for the production of best Sukuti. However, the best fruits are sold for table purpose

- Open drying of apple slices takes 3-5 days depending upon the clearness of sky. This is one of the problem for large scale production but the use of UV plastic driers or plastic tunnel may be options for Jumla where electricity is in short supply.
- Unattractive package is another limiting factor and brand name is also equally important.
- The sukuti is not qualitative due to lack of appropriate drying technology. Raj Bahadur Khatri took dried apple to Kathmandu super market but they did not accept it because it was of brownish colour (white coloured sukuti is demanded).
- 104 food items' standard has been defined by Nepal's Food laboratory and Nepal Standards but apple's standard is not yet defined (process has started).

District Agriculture Development Office

- Provide technical support for production and marketing to the apple growers and apple marketers. They also supply grafted plants to growers through some co-operative and also directly by them. They also provide training an apple farming. However, they have some constraints as follows:
 - They are inept in apple farming technologies and practical skills like pruning, training, disease and pest control measures.
 - Lack of staff experienced in market and post harvest management. They are also less capable for mobilization of farmers.

Co-operative

- They provide inputs like grafted seedlings, seeds, micro nutrients and plant protection inputs.
- They Co-ordinate with marketers and producers. However, they have some constraints which are as follows:
 - They are unable to cover large no. of apple growers and farmers who are not its members.
 - They are very good in social mobilizing activities but they are unable to do so due to limited fund.

Input suppliers

- They are the agrovets which are 6 in numbers at Jumla district.
- They supply all kinds of agriculture and vet inputs to the growers and producer groups. They also supply these inputs to DADO and NGO who will provide these inputs to growers.
- They bring the inputs from input wholesalers at Nepalgunj Surkhet or even Kathmandu. They also do have some constraints that are as follows:
 - They say, their sales decreased due to declaration of organic District because organic inputs are less demanded and are less sold.
 - Growers complain that the inputs they supply are expensive and poor in quality.

Table 32: Selected Value chain constraints and market based Solutions for Apple

Constraint	Market based solution	Service provider
<ul style="list-style-type: none"> Inadequate production of high demanding apple variety seedlings Low productivity and low cash income of apple growers 	<ul style="list-style-type: none"> Train and supervise the nursery owners and make easy access to loan. Train apple growers on plant nutrition, plant protection, pruning, training, moisture conservation i.e. water harvest etc 	<p>DADO, NARC and financial institutions.</p> <p>DADO, NARC elite or leader farmers for farmers to farmers training</p>
<ul style="list-style-type: none"> Disorganize markets and marketing infrastructure 	<ul style="list-style-type: none"> Manage to construct multi purpose collection centre at Jumla, production centre road heads and big multi market centre at Surkhet 	<p>DDC, DADO, LDO</p>
<ul style="list-style-type: none"> Poor quality low marketability and low price of Jumla apple 	<ul style="list-style-type: none"> Train growers to follow improved practices and introduce grading and cleaning fruit. 	<p>NARC, DADO, NGO/ INGO, Co-operative</p>
<ul style="list-style-type: none"> Low price at harvest and low income of apple growers 	<ul style="list-style-type: none"> Introduce community cellar store and manage to use cold store at Kohalpur 	<p>Grower groups, Co-operative marketers</p>

Box 4: The Dilemma of Odd Scale (adhkalcho)

Nepal's high value agriculture has been plagued by the dilemma of odd scale. If the production is increased, the local market is quickly satiated. For export, the quantity demand becomes a binding factor as evident from the following fact.

In the year 2001, about 12 metric ton of apple was exported from Jumla to Bangladesh via the Biratnagar custom port outlet. The Bengalis liked the Nepalese apples from Jumla. The following year, a team of few traders from Bangladesh reached Jumla and met with the apple producers there. They disclosed that the apples from Jumla are of better quality than Indian apples and hence they would like to continue importing apples from the Karnali region. But when the farmers were told of the quantity required (50,000 mt per year), they had their fingers crossed. It was not possible to produce that quantity of uniformly graded apples. The traders said they would not like to import apples to Bangladesh from several sources and hence, if Nepal can meet that supply level, they would resort to Nepal's export. The farmers were not organised enough to meet that supply level thus resulting in no export from subsequent years.

4.6.11 WALNUT

Why the product is selected?

- Non-perishable nut crop
- Potential of high demand and expansion of production areas
- Unmet current demand
- High income generating crop
- Extra income from dye (leaves and barks)

Introduction: Walnut is a perennial temperate fruit crop which is commercially grown from 1,500 masl area but quality fruit is produced above 2,000 masl. It is equally suitable to apple growing area where least rainfall occurs. However, in the high hills and mountain areas where apple is not

suitable due to more rain, the walnut is appropriate for non-apple growing areas of the high hills and mountain. Local and wild cultivars are not suitable for market and they are also not accepted by the consumers. But oil from wild and local walnut is used as edible oil in many parts of karnali zone. The thin shell improved cultivar fruits have high demand within and outside the country.

Grafted improved thin shell variety starts bearing fruit from 5-6 years (50-75 number of fruits) and becomes semi commercial (500-800 fruit) from 10 years age and fully commercial (1,800-2,500 fruit) from 15 years onwards. Like in apple it does not need annual pruning and training for fruiting and fruit quality improvement. It has been observed

that a 10 year old grafted walnut tree produces on an average 700 fruit number. These fruits give about Rs 1,200 – Rs 1,400 per tree per year. 12 trees from a ropani will then give the gross income of Rs 14,400 to Rs 19,600 which is very attractive cash income for those farmers who have no other sources of cash income. Though highly perishable fruit crops like peach, plum, apricot can be grown successfully but have limited market and difficult to transport. Besides, the leaves and barks of walnut can produce high quality dye which many growers in the area do not know. In the future when its importance is known, more income can be realised by the growers.

The problem faced by the grower is the lack of grafted plants of improved thin shell cultivar. This problem can be addressed by the encouragement to private nursery under the supervision of Horticulture centre, Rajkot, Jumla. High hills and mountain areas of Jajarkot, Dailekh and Kalikot should be promoted for commercial farming of this crop.

In walnut, the technology is needed to make the dried fruit white. The flakes are sold at Rs.120/kg. 70% hard fruit and 30% soft fruit (easily broken by teeth)

Actors description and their Constraints

Actors involved in apple are also involved in the crop. Therefore, please see apple actors for walnut also except for the following:

- Farmers reported that they receive wild or local walnut seedlings in place of grafted seedlings though they paid for grafted seedlings. This is due to non-removal of wild variety branches (suckers) which came out below the grafted union from root-stock. It is necessary that early 3 years of planting the wild suckers coming from below the union should seriously examined and removed.
- Sometime, nursery owners may also mistakenly supply non budded or non grafted plants. In such situation farmers should see the grafted part or union which is little swollen or mark of joining of scion on stock can clearly be seen.

4.6.12 ORANGE (CITRUS)

Why the product is selected?

- Unmet market demand
- Large number of small farmers involved
- Good cash generating crop
- Gender friendly and non-labour intensive
- Possible of expansion in large areas by large number of small farmers.

Introduction: 800-1,500 masl altitude areas with North facing barilands are the most suitable areas for commercial orange farming. Most of the orange plants are of seedling origin meaning propagated by seed and they are poly-embryonic and hence produce nucellar seedlings which are equivalent

to grafted plants meaning the seedlings are true to type. It is therefore farmers raised seedlings from seeds collected from their best plants are acceptable provided they are raised above 1,000 masl where virus vectors are relatively low.

Orange trees produce few fruits from 5 years (non-grafted plants) and become commercial from 10 years of planting. In this context a 10 year old orange tree with good management practices produces about 80 to 100 kg fruit (650 – 950 fruits) which gives the gross cash income of Rs 975 to Rs 1,425. In one ropani there will be 15 to 20 plants which produce 1,200 kg to 1,600 kg fruits which give the cash gross income of 14,625 to Rs 28,500. This cash income will be equivalent to 488 kg to 950 kg normal rice. This quantity of rice is adequate for 3 to 6 months for the family of 5 members. It is estimated that 3 ropani orange orchard ensures adequate family food security for a year.

However, major and micro nutrient deficiency, die-back virus, pink, root rot and powdery mildew diseases, aphid scale and green sting bugs, insects/pests are important problems for reducing productivity and declining tree health.

Addressing these problems is not difficult by the application of currently available low cost technologies.

Parts of Jajarkot, Dailekh, Kalikot and Achham where the altitude ranges from 800-1,500 masl are suitable areas for promotion of citrus farming.

This crop to date has not experienced market problems. Orange farmers even from a day walk from their farms to road heads or market centre come and sell their oranges. It is harvested when weather is very good and favourable for farmers and marketers. It has unmet demands of both domestic and export markets to India.

Tight but thin skin orange fruits produced in Dullu areas of Dailekh are very much preferred by the marketers and consumers due to unique taste and high keeping quality.

At harvest time from November to January, the wholesale price of orange per kg at collection centre is Rs 13 to Rs 15 (The wholesale price of an orange fruit is about Rs 1.5 to Rs 2.0), however, whole sale price goes to Rs 30 to Rs 40 per kg from February to April. Storing fruits for about 2-3 months at farm level enhances the income of farmers by Rs 15 to Rs 25 per kg. There is a loss of about 20 to 30% in store and reducing these losses also increase the cash income by 40 to 60%.

Use of Cellar store at farm level enhances the income by improving value of the orange. However, of the 20 cellar stores in Dailekh district, 8 are not functioning.

Actors description and their Constraints

Nursery man/woman

- Grafted or seedlings raised from selected mother plant fruit seeds are produced by private and NARC Research Station Dailekh and National Citrus Research Centre, Dhankuta and are distributed to farmers through DADO and NGO.
- Some nurseries are located at higher than 1,000 masl which are good for production of healthy seedlings while there are some others nurseries which are located at lower altitudes than 1,000 masl, the plants produced by these nurseries will not be healthy due to presence of virus vectors.
- The demand of healthy seedlings are always high and it has never met the demand and in many cases the seedlings produced at lower areas which are in general of poor quality are supplied.
- At lower areas, plants grow faster and are ready to replant from 1 to 1.5 years, however, in high altitude, seedlings grow slow and takes about 2 to 2.5 years for transplanting in the field. The DADO, NGO and many growers prefer to buy plants produced at lower areas due to standard height and attractive plants. In fact the use of plants produced by such nurseries should be discouraged. The nursery owners have some constraints to raise the seedlings and they are as follows:
 - The good nurseries are small and unable to fulfill the demands while bad nurseries which are at lower area are large and produced more no. of seedlings of poor quality.
 - Plants from these nurseries should not be allowed to collect and distribute to the farmers.
 - Some nursery owners have no mother plants of their own and if available, they are not screened or examined for virus and covered by cages.
 - Plants are not well cared particularly in plant protection, nutrition, watering, weeding etc and hence they are weak and sickly.
 - Except, few nursery men and women, they are not well experienced and they have poor skill on plant production and nursery management. Such nurseries should be discouraged by not buying the plants from them.
- Seedlings are mostly raised from seed and raising on polypots should be encouraged.
- Unhealthy and weak seedlings are produced and sold due to high demand and low altitude nursery owners.
- Physical facilities like net house, plastic houses, water tank or ponds etc are lacking in citrus nurseries.

Orange growers

- They are small to medium farmers Janajati and Dalit and are also growing orange.

- Average orange plants per household at citrus growing areas of Dailekh and Jajarkot ranges from 10 to 40. They are still planting means increasing the areas of orange due to high income from orange farming.
- However, they are untrained and they are also lacking important or key technologies of orange farming.

These orange growers have many constraints and major constraints faced by them are as follows:

- Root rot, pink, virus and powdery mildew diseases
- Aphid, scale insect, green sting bug and fruit fly.
- Inadequate use of manure and fertilizers so, macro and micro nutrient deficiency.
- Fruit dropping and fruit cracking.
- Poor drainage in rainy season and moisture stress from flowering to fruiting stage in spring season.
- Inadequate pruning and training activities.
- Unorganized orange farmers and farmers group in production and marketing activities. Some farmers sell the fruits when they are still in trees before Dashain due to the need to buy food.
- In general, poor productivity, short life of plants (10-12 years) decline or dying of trees are the main problems of orange crops and orange farmers.
- Similarly, use of wrong harvest methods and lack of storage technologies are other constraints causing less the income to the growers.

Fruit Collectors

- Mostly they are from local production areas and sometimes, they are also from Surkhet, Nepalgunj, Kohalpur.
- They buy in cash and supply to wholesalers in cash.
- They also work as wholesalers at the collection centre. These wholesalers well linked to the wholesalers at Surkhet, Nepalgunj and Kohalpur. These collectors are facing the problems are s follows:
 - Small Collection Centres or event absent and also is unorganized.
 - Received ungraded fruits mean mixture of everything. loss due to this is 5 – 6%.
 - Small direct losses (5 – 6%) from farm to collection centre to wholesale markets of Surkhet, Kohalpur, Nepalgunj due to unsuitable containers, damage fruit at harvest and transportation from farm to collection centre.
- They are relatively poor and financial institutions reluctant to finance them.

Wholesalers

- Two tier systems of wholesalers in orange marketing - one is at collection centre of production areas and other at cities.

- Wholesalers at cities also receive the fruits from collectors, sometimes growers and grower groups also from co-operative and first tier primary wholesalers from collection centre.
- The wholesalers from Surkhet or Nepalgunj distribute to their local retailers and also supply to other cities wholesalers.
- The wholesalers also export to India through Indian wholesalers and even Indian retailers.

The wholesalers also have following constraints

- Receive over mature, immature, damaged, wounded, small and large size etc without grading.
- Quality fruits like tight with thin skins, unbroken pedicel (bhetno) and 100-125 gm fruit size with dark orange colour skin which are very much liked by consumers and retailers received very little (20-25%).
- Supply of inadequate quantity and irregularity of supply. Extension of production from September to February months from fresh harvest and supply from March-April from Cellar store are necessary.
- These can be achieved by use of early, medium and late maturing cultivars which are now available and use of cellar store to store fruits for 2-3 months.

Retailers

- Mostly retailers received orange fruits from wholesalers
- Some retailers they go directly to growers and buy directly from the growers.
- Some retailers also collect the fruits from collector or primary wholesalers from collection centre.
- They supply through door to door services, sell at footpath, and through Thela and mela.
- Whatever the wholesalers received from collectors, they are sold as such without grading to retailers hence, they loss up to 10-15% of unmarketable fruits.
- They are small, poor and honest but they cannot expand or increase their business because financial institutions are unable to keep them due to lack of their collateral.

Consumers

- Nepal produced oranges are liked not only by Nepali but also by the Indian consumers due

to attractive yellow colour (because Indian oranges are green skin colour comes in market from February) and unique sweet taste.

- However, supplying periods are very short from November to January months.

Processors

- Although many products like squash, fresh Juice, marmalade etc can be made from orange, the limited production even not adequate for fresh consumption has discouraged the production of these products.
- However, in recent year fruit juice makers as retailer for direct consumption and even for home and hospital patient consumption have been emerging in the cities.
- Small but good quality fruits are well utilized.
- These Juice makers are buying fruits from retailers which are very expensive. Linkage of these entrepreneurs to wholesalers, will enable them to sell Juice at comparatively cheaper price to consumers so that orange juice are further promoted.

District Agriculture Development Office (DADO)

- They provide technical know-how to orange growers and also manage to supply good quality orange seedling from various sources.
- But they are lacking in latest technologies information and practices that enhance the cash income from orange through increasing productivity quality and marketability. Some of these are: green manuring i.e. growing legume crops around the plants in 1m² up to flowering and turning them i.e. whole plants or bio mass in the soil. It is reported that 6 kg of green bio mass of bean gives 200 gm Nitrogen, along with phosphorus, potash, organic manure and trace amount of micro-nutrients. Treatment of green manuring legume seed by appropriate Rhizobium further enhances the supply of Nitrogen to orange plants.
- Two times growing of these crops - one from April to June and other from June to August reduces the under and mal-fed orange tree and also minimize the diseases.

NGO and Co-operative

Apart from Government, there is no any NGO and Co-operative supporting to orange growers in Dailekh, Kalikot and Jajarkot Districts.

Box 5: Nipped right at the Bud

Rata Nangla situated at an altitude of 7,500 feet amsl (20 km northwest from Surkhet) is an important vegetable collection centre in Surkhet district. Annually, about Rs.60 million worth of vegetables are sent to Surkhet fruit and vegetable mandies with Babu and Shahi as the main wholesale buyer. The vegetables, mainly potato and cole crops, from 3 VDCs of Surkhet (Gadhi, Jarbuta and Rattu) and 2 VDCs from Dailekh (Goganpani and Seri) are collected in this centre. Because of wholesalers' cartel behaviour, the producers were receiving very low prices for their products. For example, in 2006, they were compelled to sell potato at Rs.5 per kilo when prices at Surkhet were above Rs.10 per kilo. Some courageous producers realized the on-going exploitation and started organizing the local Cooperative (Himali bazaar Production and Processing Multi-purpose Cooperative Limited, 2006) which would directly sell vegetables either to retailers in Surkhet or to wholesalers at Kohalpur. The idea was to by-pass the district wholesalers at Surkhet and provide a larger share of sales to the member producers. The cooperative started buying potato at Rs.10 per kilo. The district wholesalers devised their plan to nip the young cooperative by intruding their own earlier agents as handling staffs of the cooperative. These staffs accepted all rotten vegetables of the farmers and the latter were happy, although turned out to be short-lived happiness, to sell all their even junk products which used to be discarded by the earlier collectors. Because of this, the vegetables started to rot in the store and there was 60 percent loss. They were able to sell 40 percent product in Surkhet and were able to pay less than half the committed price to the member producers. The cooperative lost its credibility among members and had to be closed down. Now all members are back to square one selling vegetables at mandi dictated prices.

Table 33: Selected Value chain constraints and market based Solutions for Orange

Constraint	Market based solution	Service provider
<ul style="list-style-type: none"> Low production of healthy and quality seedlings 	<ul style="list-style-type: none"> Train and supervise the nursery owners of upper parts of mid hills (1000-1400 masl) to produce more number of healthy seedlings on commercial scale. 	DADO and NARC
<ul style="list-style-type: none"> Decreasing cash of orange growers due to low productivity and declining bearing trees. 	<ul style="list-style-type: none"> Provide training to orange grower or nutrient supply, plant protection orchard management and use of quality seeds 	DADO, NARC, FG, NGO
<ul style="list-style-type: none"> Unorganized orange farmers on production and marketing 	<ul style="list-style-type: none"> Provide social mobilizing training for cohesive co-operative and effective group formation 	DADO, NGO
<ul style="list-style-type: none"> Unorganized marketing or absence of collection centre 	<ul style="list-style-type: none"> Lobbying to LDO and DADO for construction of multi purpose collection centre (Orange, spice, vegetable) 	LDO, DADO, NGO, DDC
<ul style="list-style-type: none"> Unorganized and small wholesale/ mandi market 	<ul style="list-style-type: none"> Lobbying to DDC, LDO, NGO to make large multipurpose market centre for export and domestic market at Surkhet 	DDC, LDO, DADO, NGO Municipality

Input Suppliers

- They are agrovets and mainly stationed at Districts head quarter.
- They supply all kinds of inputs necessary for Agriculture and Livestock production.
- Though they are providing their good services with their best efforts, to the orange growers,

they have still some problem and they are as follows:

- They are lacking in tech know-how and also lack of technical and marketing skills supports from specialists and line agencies etc.
- They have poor and weak linkages with orange growers, DADO, NGO and Research

4.6.13 MANGO

Why the product is selected?

- Off-season mango as cash crop for low to mid hills farmers
- Good domestic market and potential for export to India
- Potential for expansion of production.
- Women friendly and labour non-intensive
- Involvement of large number of farmers.

Introduction: Though mango is a crop of Tarai, i.e. tropical fruit crop. It is also a good cash crop for low to mid hill areas due to use of locally available and locally adopted cultivars. The fruits of these cultivars from hills come in market when Tarai varieties are almost off in the market. So it is a off-season crop.

A grafted plant of mango bears the fruit from four years of planting and increases yield gradually up to 15 years and declines yield from 20 years of age in present orchard management condition. It is reported that the fruit yield from tree of 8-10 years is about 100-150 kg (600-900 numbers of fruit) which gives about Rs 1,500 – Rs 2,250 per tree and gross income per ropani per year from 10 trees will be Rs 15,000 to Rs 22,500. This income will be equivalent to 600 kg to 900 kg rice. This income is adequate for 4 months of 5 members family. If a farmer will have 3 ropani land under mango, family food security for a year will be ensured.

Fruit size, shape and taste are acceptable by consumers and marketers, however, appearance of skin colour is not attractive due to blackish colour caused by mould development. These moulds are the result of excreta secreted by sucking insects like aphid, hoper etc. These problems can be prevented by using the organic pesticide just after the fruit set.

Actors description and their constraints

- Actors involved in orange are also involved in mango. So please refer to orange section for actor description except for the following:
- The blackish colour of mango skin is mainly due to development of fungus i.e mould which is also caused by secretion of excreta by sucking insects like aphid etc. This is occurred from fruit set. Application of systemic insecticides plus mancozab or metaloxye will reduce this problem
- Similarly alternate bearing is also noticed in mango field of some farmers means one year produce heavy crop and second year produces very little mango. This is a common habit of mango of general cultivar, however, use of "Amrapali" is a regular bearing variety introduction and testing of this cultivar is essential to boost up the farmers income regularly.

4.6.14 JATAMASI

Why the product is selected?

- High return NTFP
- Value addition possibility through oil extraction
- Large scope for area expansion and domestication

Introduction: Jatamasi is a perennial aromatic plant grown in moist and shady part of lower mountains at an altitude range between 3,000 to 5,300 masl. In the study districts, there are ideal production conditions in many parts of Jumla and Kalikot districts.

It is said that once a person dips his/her finger in jatamasi oil extract, the fragrance lasts for several weeks even if the hand is washed several times. Rhizome and leaves are the usable parts of jatamasi. It also has medicinal uses in curing cold, coughs and fever. It is collected from the forest but it has been domesticated by several farmers in community forests and private lands in Jumla. The domestication is found to generate uniform product with increased yield per unit area due to controlled production conditions.

Jatamasi is fully exported first to India and then to other countries (e.g. perfume industries of France) after separation of active ingredients. In Nepal, 70 percent dried jatamasi is converted into primary oil extract and exported while 30 percent is disposed in raw form because it is directly used in agarbatti industries in India. The active ingredient separation is done in India which adds very high value to the product and is exported to developed country markets, mainly France.

About 33 mt of jatamasi is exported from the study districts more than 90 percent of which comes from Jumla district (30 mt). The primary collectors receive a price of Rs.120 whose value is estimated to reach up to Rs.350 in India. There are 10 herb processing plants, mostly located in Nepalgunj and most of these are involved in primary oil extraction from Jatamasi and Sugandhawal. The royalty rate for collecting jatamasi from the forest is Rs.20 which is paid by the district level wholesalers.

Actors and characteristics

Input and service suppliers

Jatamasi is mostly collected from forest although some domestication has begun in Jumla. The few cultivators bring cultivar from the forest and use some farm manure during planting. District Forest Office provides training on harvesting method. There were two oil extraction plants in Jumla – one in private sector and the other one in Cooperative sector (Dillichaur) but both are not in operation. The problem is the erratic supply of electricity and

quality problems with the use of firewood. One plant was financed by ADBN (50% financing).

The poor input and service delivery in NTFP sector including jatamasi is due to the prevailing views, which include:

- NTFPs are forest products than the farm products
- Inputs and supplies in NTFP are irrelevant at the worst and unaffordable at the best. This world view is prevalent more among the government staff than the NGO/projects
- The government staff, who are often from the elite group tend to believe in command and control than in facilitation
- The non-tariff barrier is the common feature
- Forest officials believe in the official formalities than the overall sustainability of the resource and the rural poverty

Producers/Collectors

Village Collectors

- Poor/illiterate
- Do not have power or resource to collect products with independent ability to sell the products at optimum margin.
- Do not have incentive or knowledge to sustain the resource base
- Do not have know-how for appropriate storing and processing
- Not a full time occupation.
- They are bound to sell their products in low price to the collection agents
- The average collection per day in Oct-Nov is 3 kg equivalent and they receive the price of Rs.110-140 per kg.
- They have two problems – i) low and fluctuating price for products; and ii) lack of knowledge about the end use of the product.

Local collectors

They collect from villagers and the average quantity dealt is about one mt. They receive about 5 percent extra price from next level collectors.

Road-head collector and traders

- They often provide money to the collectors to assure buying back
- Relatively elite
- They receive 5 percent commission from the district based wholesalers.

District based traders

- Are often located in the district HQs
- Are generally equipped with Satellite collection station mostly along the road corridor
- More powerful and elite than the Road head traders
- The official persons with permit to collect the products
- All products are supplied to Nepalgunj wholesalers

- They make about Rs.10 per kg of product after deducting loss of about 5% due to drying.

Regional Wholesalers or Product exporters

- People who supply the products to industry inside the country or to the wholesalers outside the country
- More affluent people
- They, unlike in the fruits and vegetable, do not have any product retailer tiers
- Link between the district based suppliers and the industries/overseas
- They add value (about Rs.10 per kg) to about 70 percent product (oil extraction)

Product consumer

- Domestic consumption is only through import at very high prices (French perfumes)

Transporters:

There are different tier of transporters for eg. Village road-head to district headquarter, district headquarter to wholesalers etc. In some cases these transporter also plays role of mediator between the collector and wholesalers.

Characteristics:

- Rich people
- mostly interested their rent

Storage: Before Jatamasi and other NTFPs are sold to local agent, unusable parts are discarded and, then, the usable material is stored for some time. The duration of storage varies from one day to several months. Since collectors do not have proper storage facilities preventing NTFPs from direct exposure to sun, rain and wind, unwrapped bundles of these species are stacked on verandas and under thatched shelters without walls, or in windowless huts and dark rooms without ventilation. Damages to NTFPs also occur at the village and road-head traders' levels due to improper packaging and storage. The total loss is about 12 percent most of which occurs at the district level. Local agents do not really store the products. They simply link the road head traders with the primary collectors. Road-head traders often hire godowns to store such products until sold to the district traders. District traders and regional wholesalers have more permanent and safer storage facilities

Jatamasi is traded strictly on cash, or even advance, basis and hence external financing is not involved except for medium to large scale processing.

Processor:

- Only a few distillation plants in Nepal (about 10)
- They are rich people
- Local initiatives are not often succeeded
- They are not aware of separating the active ingredients

Relationship between actors in the chain (Inter-chain co-operation)

While in some situations, the collectors assemble the products without any prior demands, in most of the cases, the demand generates from wholesalers in India. They place demands to the Nepalgunj based whole sellers who relays the message to the district based traders, which ultimately ends in the village level collector.

Table 34: Selected Constraints and Market based solutions for Jatamasi

Type	Value chain constraint	Solutions	Possible solution provider
Input supply (Cultivation constraint)	<ul style="list-style-type: none"> - Lack of sufficient land for cultivation of rural poor people - Seed/sapling for cultivation 	<ul style="list-style-type: none"> - CF/LHF program, land allocation for the poor in CF - Supporting nursery establishment and seedling production - Seed and seedling distribution 	<ul style="list-style-type: none"> - MOFSC, DoF - DFO, DPRO - NGOs
Technology/product development (production constraints)	<ul style="list-style-type: none"> - Lack of NTFP farming guideline - Lack of inventory (mgmt) guideline - lack of harvesting guideline - lack of training for seedling production - Lack of processing plant near to the corridor 	<ul style="list-style-type: none"> - prepare farming, inventory and harvesting guideline - awareness training for collector - Establishment of small processing plant in corridor area and big processing plant in a country 	<ul style="list-style-type: none"> - DoF, DPR, - DFO - DoF, DPR, / - Private interpreneur
Market access (Market constraints)	<ul style="list-style-type: none"> - Lack of domestic price setting or control- - Lack of information about market channels , price and end use 	<ul style="list-style-type: none"> - Research on market channels and end use of NTFPs both within the country and outside. - Create awareness about market channels - give knowledge about value addition possibilities and price information to various stakeholders including collector and farmers 	<ul style="list-style-type: none"> - Dof, - FECOFON, - NGOs - NTFP networks
Organizational and Management (management constraints)	<ul style="list-style-type: none"> - Lack of networking or cooperatives of farmers of primary collectors (Networking only in the apex) 	<ul style="list-style-type: none"> - Establish a network or cooperatives of farmers or primary collectors 	Local farmers/ Collectors
Regulatory (policy) (Policy constraints)	<ul style="list-style-type: none"> - Lack of implementation - lack of legal provision for MAPs cultivation - Lengthy and cumbersome process and unseen cost for getting collection and export permission 	<ul style="list-style-type: none"> - effective implementation of NTFP -development policy - Practice NTFP registration as is the case with private forest. - Simple registration of private NTFP farming. - Barring royalty collection for NTFPs from private source (the verification process of product origin should be hasselfree.) - use the "seal" practice as has been recently used in chalani of timber product 	<ul style="list-style-type: none"> - MOFSC - DFO

Table 34 continued: Selected Constraints and Market based solutions for Jatamasi

Type	Value chain constraint	Solutions	Possible solution provider
Governance	<ul style="list-style-type: none"> - Ineffective monitoring of harvesting from the wild - official permission only by businessmen than the real collectors. - unnecessary hassles in NTFP transportation - haphazard taxation by local government and local clubs and institution. - NTFP as unseen business 	<ul style="list-style-type: none"> - Strengthening of monitoring of harvesting - local collectors empowered to get collection permission. - removal of unnecessary barriers (the "sealing" system may control unauthorized used. - haphazard tax collection and forced donation must be stopped. 	<ul style="list-style-type: none"> - DFO,CF,VDC,DDC - local NGO,civil society organization - DoF,DFO - National/Local government

Box 6: The Notorious and Iniquitous Trade Game

Trade in NTFPs is considered invisible business in Nepal. Since about 95 percent of the NTFPs reach India, the trade is virtually controlled by the Indian traders across the border including price setting. Most traders at Nepalgunj are reported to act like agents of the Indian traders.

A district wholesaler from Surkhet wanted to sell his stock of timur directly in Delhi hoping to get extra returns that the Nepalgunj traders have been enjoying. Although nobody knows exactly how much margin these Nepalgunj traders are capturing, it is believed that they export in rates at least equal to the Indian currency for the price they have been paying in Nepal – i.e. at least 60 percent above the cost. The cost of transporting NTFPs from Nepal border to Delhi is estimated at RS.5 per kilogram. When the Nepali wholesaler took his goods to Delhi, the large traders there offered him the price which was lower than had he sold the consignment at Nepalgunj itself. He also incurred higher cost of transporting the consignment to Delhi (Rs.8 per kg) and more non-tariff hassles than had it been hauled by an Indian-looking trader. The reason for offering lower price by the Delhi trader was that they were already apprised (by the Nepalgunj traders) of the fact that a Nepali trader is directly bringing the consignment there. They had warned that if higher price is offered to the Nepali trader, future supply from Nepal will be disrupted. Since bring the consignment back would entail further cost and hassle, he had to sell the goods at lower price than in Nepal.

A mandi owner, also from Surkhet, ventured to enter into export business on vegetables and NTFPs in Nepalgunj but the existing traders there made his life difficult and had to retreat back to Surkhet.

Retailers are generally the poorest among the value chain actors. They incur 15 to 20 percent loss due to receiving products that are not cleaned and not graded. They need suitable and inexpensive storage arrangement. In Kohalpur cold storage, at least 3 months' storage charge has to be paid even when stored only for a day. Such arrangement is not suited to retailers.

4.6.15 TIMUR

Why the product is selected?

- Climatically suited to many areas of the study districts
- Possibility of price rise in the future
- Poor friendly

Introduction: Timur is harvested from a thorny shrub from the Altitude range of 500-2,500

masl in sub-tropical region. The shrub is found in degraded slopes and shrublands. It is collected from the forest as well as grown in community forests, lease forests and private lands. In private lands, the shrub is planted in the bunds of bari land which also serves as fencing for crops inside. The harvesting time is August to November. In Nepal, timur is used as chutney, tooth paste industry and by ayurvedic vaidyas for medicinal purposes for cold, cough and fever. The bark is for poisoning the fish. The parts used are fruit, bark, leaves and flower.

Scientifically it is known to have been used as carminative, stomachic, control of toothache and leech repellent. Nobody knows what is the end use of exported timur which goes in dried raw form. Some timur (about 5%) is directly sent to

Kathmandu for domestic consumers by the district or regional wholesalers.

Total export of timur from the study districts (Salyan, Jajarkot, Surkhet and Dailekh) is around 200 mt per year of which about half comes from Chhinchu-Jajarkot road corridor. There are 15 collectors of timur (along with other NTFPs) in that corridor. The royalty rate for the collection of timur is Rs.8 per kg and those who are cultivating timur in their private lands are also paying the same royalty which should have been exempted. Forest officials say that, for such exemption, private forest must be registered either in terms of number of bushes or the area. The process being cumbersome, only 5 private forests have been registered in the study districts mainly to grow timur, Rittha and chirainto.

Timur oil is not extracted in Nepal and is exported in dried fruit form. The price of timur is fluctuating and this may be the product which has faced largest annual swing in price. In 2003/04, the price per kg of timur reached up to Rs.120 at the farm-gate level but it dropped down to Rs.25 in 2007. This is partly because of the notorious act of some traders in the value chain (see box-1). Its current value for the Indian traders is up to Rs.70 whereas the collectors get only about Rs.30 per kg.

About 15 percent of the timur is lost mainly due to drying. A trader said that a 40 kg bag of timur weighed only 32 kg after 3 years of storage. The loss is distributed equally at all value chain levels.

About 100 mt of timur is exported from the study districts which mainly comes from Salyan, Surkhet and Dailekh districts. About 80 mt comes from Chhinchu-Jajarkot road corridor involving about 900 households. Ninety percent of the timur is harvested from community forest and private land. The government statistics shows 52 mt of timur harvested from the government forest. If a grower/collector wanted to take his/her timur directly to Nepalgunj, the cost is Rs.6 per kg apart from the royalty.

The actors and their problems in Timur are the same as in the case of Jatamasi and hence it is not repeated here. Some specific problems of timur are as follows:

- Hailstones (exogenous – no solution)
- Problem if there is no rain during flowering (exogenous – no solution)

- Lack of knowledge for harvesting (stems broken) (Training on harvesting method)
- Foreign material mixing (Mobilisation on business ethics)
- Price going down
- If not dried well, there is fungus development (proper drying)

4.6.16 RITTHA

Why the product is selected?

- Potential to sell directly in the third countries
- Easy collection and cultivation
- Potential for high income for the poor (from collection)

Introduction: Rittha is a deciduous tree found in altitude ranges of 1,000 to 1,500 masl. The tree grows well in open sloppy and sunny conditions. Its fruit is the usable part which is used in washing clothes. The industrial use is in producing shampoo, soap and detergents. The medicinal value is in the curing of epilepsy.

A major problem in Rittha which has begun to be felt recently is the premature dropping of the rittha fruits which has reduced the net yield of cultivated rittha. Even the forest authorities have not found the reason for such problem.

Rittha 150 kg per tree (6-10 years tree) Each house has 1-2 rittha tree

In rittha nursery, sapling are becoming yellow

4.6.17 SUGANDHAWAL (SAMAYO)

Why the product is selected?

Introduction: Samayo is a perennial herb found in the altitude range of 1,200-3,660masl which is grown in moist, north facing shady slopes of temperate region with Rhododendron and pine. The usable parts are rhizome and leaves. As the name in Nepali suggests, it is an aromatic plant which is used in producing shampoo, perfume and other aromatic products. It is also used for medicinal purpose in severe headache, migraine and in curing nervous disorders. About 30 percent of Samayo is exported as oil extract and the rest is exported in raw dried form.

Total trade of Sugandhawal in the study districts is about 20 mt of which 9 mt comes from Jumla. In Jumla, 9,000 households are involved in Samayo collection.

WUPAP is planning to bring one oil extractor in Jumla and saplings of one species of Samayo.

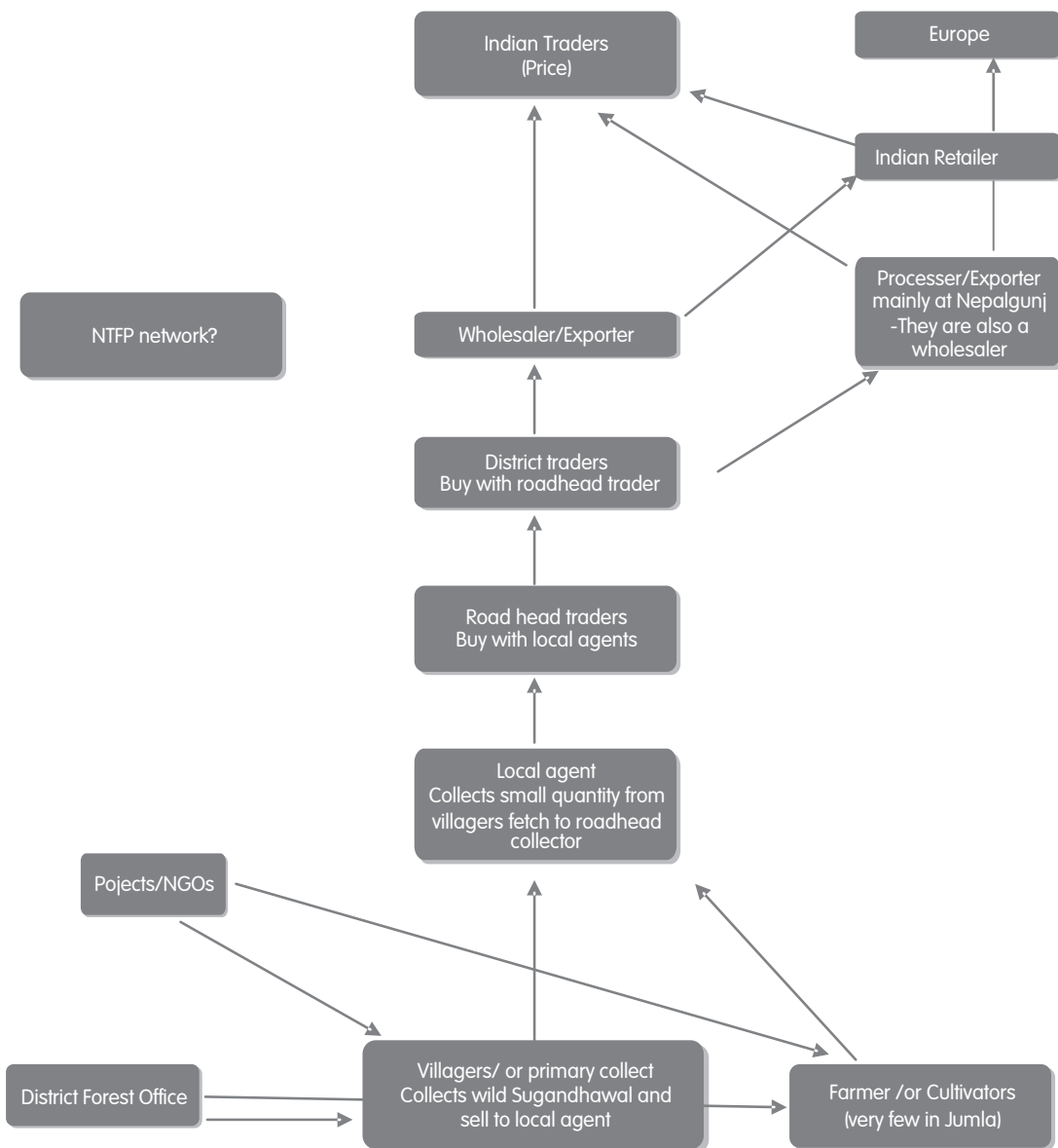


Figure 6: Value Chain Map for Jatamasi and Samayo

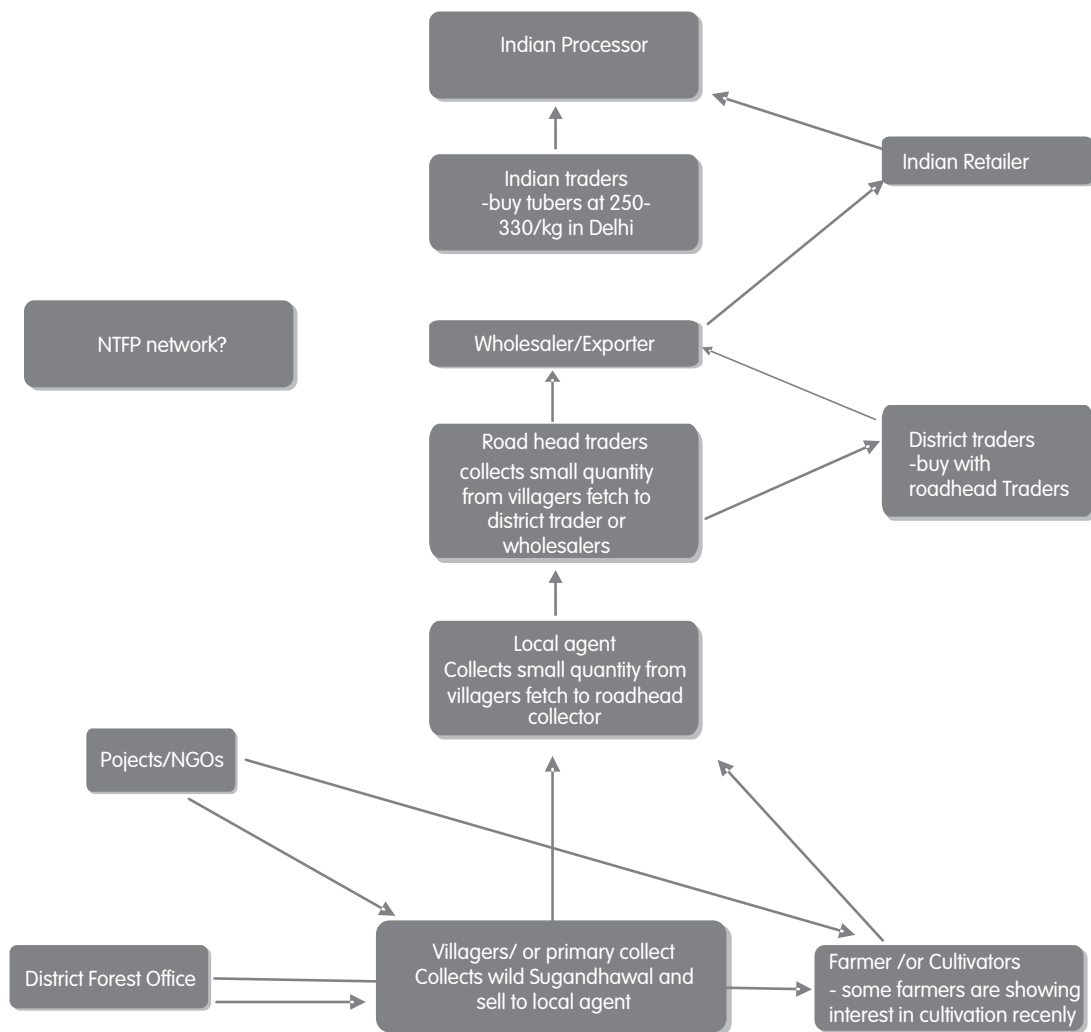


Figure 7: Value Chain Map for Atis, Kutki, kurilo and Kaulo

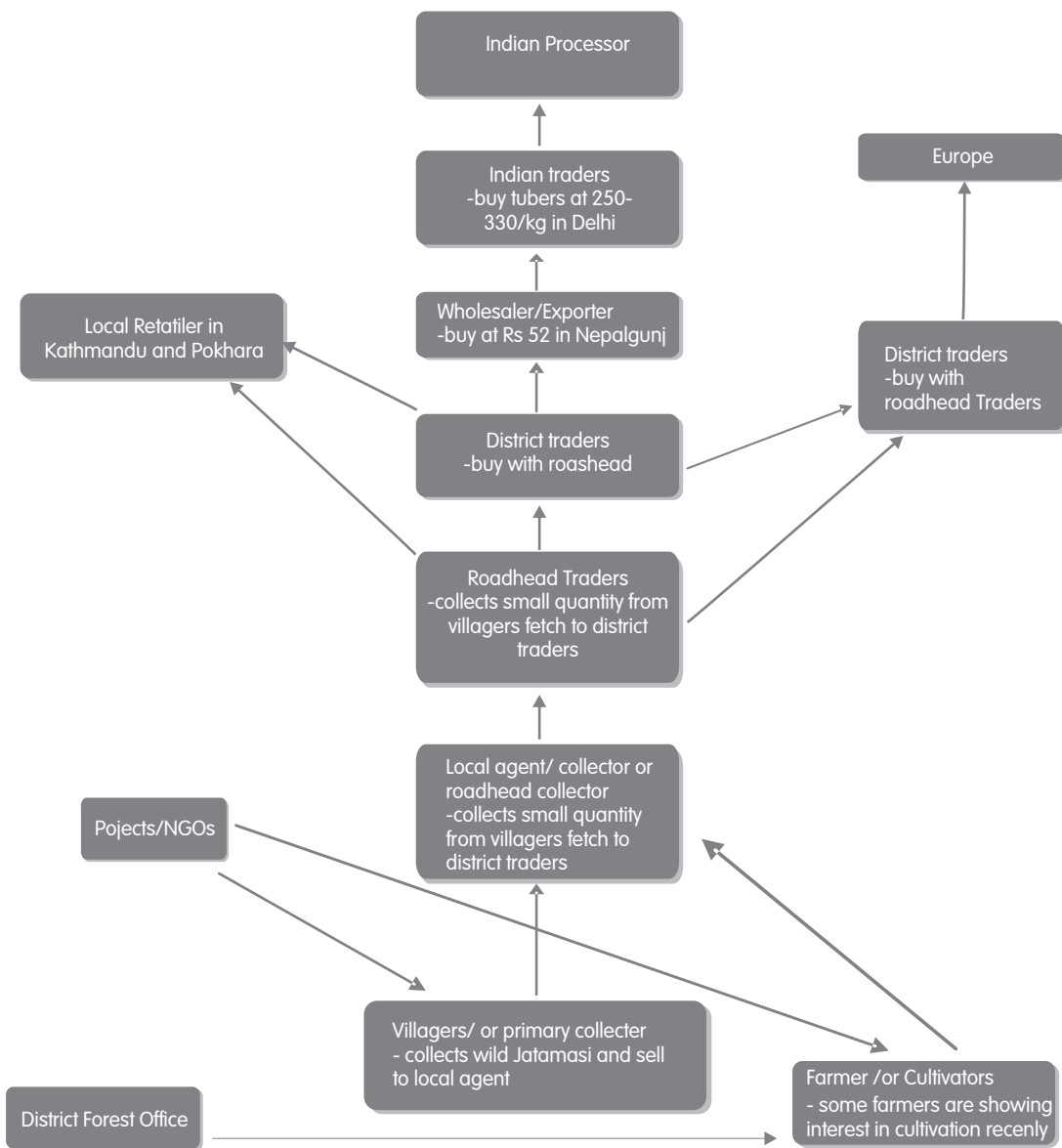


Figure 8: Value Chain Map for Timur

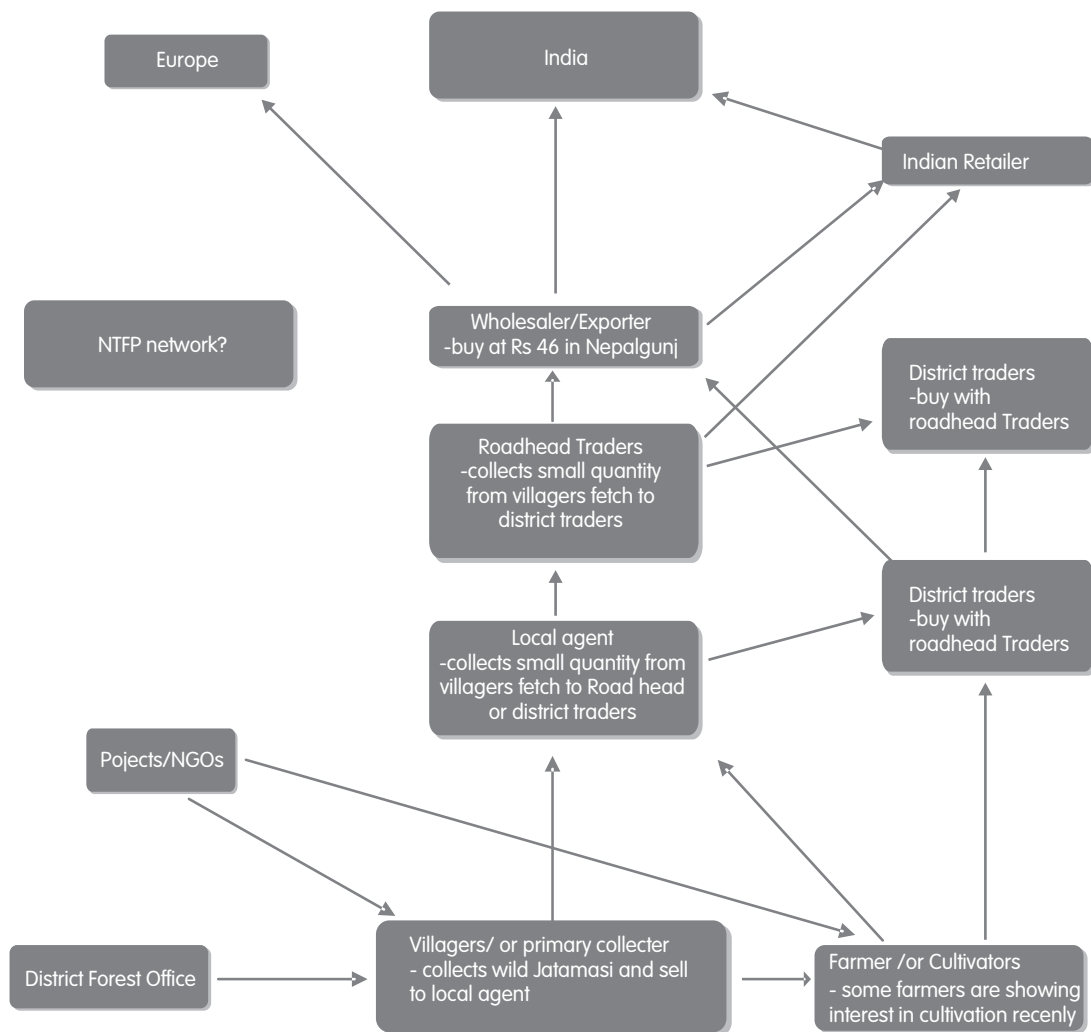


Figure 9: Value Chain Map for Rittha

4.7 PRODUCT VALUE FACTORS

Factors are the listing of all activities done by a value chain actor. "Value Factors" show what needs to be done or changed to provide greater or maximum value for each factor. Following practices are desired at various levels:

Production	Desired Processes Right variety demanded by the market Optimum inputs application Optimum plant protection Optimum cultural operation Appropriate harvesting method Primary processing (e.g. Cleaning) Product grading Proper storage
Collection	Primary processing (e.g. Cleaning) Product grading Proper storage
Large Scale Processing	Choice of most efficient technology Proper management Use of skilled/trained workers Proper storage Proper packing and labeling
Wholesaling	Competitive operation (no monopoly and cartel) Following the business ethics
Retailing	Fresh and graded product In size and package liked by the consumers

In production/collection, the study has estimated only about 50 percent compliance of the desired process. The resulting yield gaps due to wrong and inadequate processes are discussed in respective product sections. Large scale processing is virtually non-existent except for rosin/turpentine and Jatamasi/samayo. Wholesaling is found to involve invisibility and fraudulent practices with the existence of monopoly and cartels. Retailing is relatively closer to the desired practices. Hence, there is a lot of possibility for changes under the product value factors.

Some Value Addition Practices Found

Table 35 shows some value addition practices at very small scale (about 5% of the products). The Table reveals that the value of raw product can be increased from 50 to 100 percent with processing and proper storage.

Table 35: Some Value Addition Practices and Returns

Product	Fresh per kg product	Fresh/kg price	Other costs/kg	Total cost (Rs./kg)	Final product price/kg	Incremental value addition		
						Product/kg	Fresh/kg	VA (%)
APPLE								
Cut and dried	10	8	40	120	250	130	13.00	163
Jam/jelly	3	10	90	120	150	30	10.00	100
Direct dried	7	10	10	80	120	40	5.71	57
Two month storage	1.1	10	10	21	30	9	8.18	82
Four month storage	1.2	10	30	42	60	18	15.00	150
ORANGE								
Two month storage	1.2	8	3	12.6	15	2.4	2.00	25
Four month storage	1.4	8	3	14.2	20	5.8	4.14	52
SILAJIT								
Purification	2.5	250	5	630	1500	870	348	139

In NTFPs, the export to India is in the following forms:

Table 36: Export Form of Selected NTFPs

NTFP	Exported in form (%)	
	Oil	Raw
Jatamashi	70	30
Sugandhawal	100	0
Sugandha kokila	20	80
Jhyau	0	100
Timur	0	100

HVA Products' Purchasing Power

An analysis of purchasing power of HVA products was examined taking potato (common product in the study districts) as the HVA product and comparing it with rice, urea, DAP prices and labour wage rate. The current prices of these products and their prices in 1980 were compared. The result is presented in Table 37. According to the table, the purchasing power of potato has declined by about 50 percent to over 300 percent.

Table 37: Purchasing Power Erosion due to Asymmetric Price Rise (2030-2065) 4.8

Particulars	1980	2008	Growth rate (%)	kg potato will buy	
				1980	2008
Potato price (Rs./kg)	3	15	5.51		
Rice price (Rs./kg)	4.5	40	7.55	0.67	0.38
Urea price (Rs./kg)	2.5	35	9.20	1.20	0.43
DAP price (Rs./kg)	3.2	55	9.94	0.94	0.27
Labour wage (Rs./day)	5	135	11.61	0.60	0.11

Source: DVN Field survey (2008)

GENDER ANALYSIS

The study team has found that the women of the study districts have been overburdened with work. Such higher work burden of women is more prominent in Jumla district. For example, nearly 74 percent of the operation in apple farming and sale are done by women in Jumla (Table 38). Table 39 shows that, in vegetable cultivation also, the share of women's responsibilities is found to be much higher than men.

Box 7: Consumer survey

The per capita requirement of composite vegetables including potato is 72 kg per year. On this basis, the daily requirement per capita works out to 200 grams. For an average family size of 6 persons, the daily requirement is 1.2 kilogram. Average days for a private family for which vegetables are purchased is two days. Hence, one time purchase of vegetables is 2.4 kg. If 2.5 kg pack of mixed vegetables (cut and cleaned for direct cooking) is prepared, the consumers will save considerable time in vegetable procurement and cleaning. Every day, about one and a half hours of a medium class family is spent on buying, cutting and cleaning of vegetables. This task is mostly done by women.

Hotels have no size problem but the individuals households have.

An enquiry during a FGD in Dailekh (Guranse) revealed that women wake up one hour earlier than men; sleep half an hour after men, and do 20 different works of small to medium spells in a day. The transition from one spell of work to another can be taxing for the brain. It is therefore necessary for the project to identify and promote women friendly enterprises so that they are not further burdened. Women's major time is spent on conventional processing of food (using native dhiki for rice hauling and janto for grinding cereals and pulses); fetching water from a distance, collecting fodder

and firewood, and child care. More women have respiratory problems due to smoking ovens. They have problems in open defecation. In order to save women's time for productive project work, the additional social and other components like grain processing mills, piped drinking water, forest improvement, child care, improved cookstoves, improved pit latrine, etc could be included.

Table 38: Woman's Share of Workload in Apple Farming in Jumla, 2008

Operations	Work days required/ropani	Work share (%)		Women's share (%)
		Male	Female	
Land preparation	4	70	30	1.2
Planting	1	100	-	0
Manure application	5	-	100	5
Pruning	10	80	20	2
Picking	15	-	100	15
Transportation from farm to home/market	5	-	100	5
Selling	5	-	100	5
Apple peeling	5	-	100	
Apple juice making	4	25	75	
Apple brandy making	5	75	25	
Total	59			33.2
Percent				73.8

Source: DVN Field survey (2008)

In most districts, it was reported that the workload of women has increased significantly with the involvement in producing and marketing the HVA products. However, they are satisfied that their income and nutrition status has improved considerably.

Table 39: Woman's Share of Workload in Vegetable Farming in the Study Area, 2008

Operation	Male	Female
Land preparation	50	50
Weeding	25	75
Manure application	-	100
Harvesting	40	60
Packing	30	70
Carrying to market	40	60
Selling	20	80
Decision making	50	50

Source: DVN Field survey (2008)

4.9 BASELINE OF VALUE CHAIN ACTORS AND PRODUCTS

Baseline information about actors and products are scattered all over the report. Some basic baseline data obtained from the secondary sources are compiled in this section.

The estimate of production of different fruits and vegetables in the study districts is as follows:

Table 40: Potential Value Chain demand in mid western at FWD Region

Value chain	Present production(Ton)
Tomato	3600
Onion	85
Green Chilly	24
Green bean	160
Green pea	10
Cabbage	2500
Cauliflower	1500
Carrot	60
Radish	300
Ginger	52704
Dry red hot Chilly	30
Garlic	115
Apple	4200
Walnut	1373
Orange	5254
Mango	1867

In NTFPs, the largest traded item is timur (about 500 mt) of which half comes from Salyan district. Total Jatamasi trade volume is 55 mt and Sugandhawal is 20 mt (9 mt from Jumla). The traded volume of Kutki is 25 mt and Rittha (225 mt).

Table 41: Area, Production and Productivity of Different product groups in the Study Districts, 2006/07

Product groups	Salyan	Jajarkot	Surkhet	Dailekh	Kalikot	Jumla
Potato	1,350	615	750	588	840	2,200
Oilseeds	710	285	3,725	701	82	130
Pulses	1,217	585	3,070	1,079	312	207
Vegetables	2,216	543	1,640	2,155	188	647
Spices	837	85	542	237	47	103
Fruits	661	372	664	650	505	643

PRODUCTION (mt)

Product groups	Salyan	Jajarkot	Surkhet	Dailekh	Kalikot	Jumla
Potato	16,875	5,540	11,153	5,890	7,500	19,010
Oilseeds	600	232	2,905	579	42	95
Pulses	923	516	2,946	824	214	166
Vegetables	31,369	5,384	24,996	23,590	2,063	5,326
Spices	9,651	697	4,136	1,471	437	476
Fruits	6,284	3,508	5,079	6,360	4,168	5,423

YIELD (kg/ha)

Product groups	Salyan	Jajarkot	Surkhet	Dailekh	Kalikot	Jumla
Potato	12,500	9,008	14,871	10,017	8,929	8,641
Oilseeds	845	814	780	826	512	731
Pulses	758	882	960	764	686	802
Vegetables	14,156	9,915	15,241	10,947	10,973	8,232
Spices	11,530	8,200	7,631	6,207	9,298	4,621
Fruits	9,507	9,430	7,649	9,785	8,253	8,434

Table 42: Baseline of Facilities for HVA and NTFPs Production and Trade

Facilities	Salyan	Jajarkot	Surkhet	Dailekh	Kalikot	Jumla
Agro-vets	26	3	40	13	2	6
Cellar store	13	1		20	2	7
Cellar store capacity	26	1.5		45	10	
Rustic store	1	1	2	10	6	6
Rustic store capacity	2	3	6	80	30	
Commercial farmers	0	0	0	0	0	0
Hat bazaars						
Twice a week	1			1		
Once a week			3			
Collection centres	1		14	7		2
Volume handled	3298		1200	3265		
Wholesale centres	1					
Volume handled	3298		5805			
Farmers involved in trade			15	7		17

Table 43: Baseline of Different Forest Areas

District	Total Forest Area (ha.)	Community Forests (ha.)	Leasehold Forests (ha.)
Jajarkot	135615	13621	213
Dailekh		14767	123
Kalikot	49461	6769	-
Mugu	111099	8060	Not handed over yet
Jumla	104570	15215	794.25

4.10 FOOD SECURITY

4.10.1 Current Situation

Long crop growing seasons, low crop productivity of conventional cereals, high population density per unit of cultivated land, and frequent natural calamities like hailstone render the districts of mid-west, particularly those lying in the higher altitudes, vulnerable to food security. MOAC/ WFP report on Rapid Emergency Food Security Assessment (EFSA), July 2008, for 9 districts of mid and far western region including 4 study districts shows negative overall district balance in calorie supply (Table 44). The report states – “For the last three years, the Hill and Mountain districts of Nepal’s Far- and Mid-Western Regions have been affected by recurrent droughts, hailstorms, landslides, and crop pest/diseases. The drought and hailstorms of 2007-08 severely damaged the winter crops, resulting in wheat and barley losses of up to 80% in various areas of Kalikot, Humla,

Mugu, Dolpa, Bajura, Achham, Dailekh, Rukum, and Jajarkot districts. Over 300,000 people were estimated to be facing a situation of food insecurity, with 50,000 people already in an acute food insecurity situation”. Hence, the WFP Food Security Monitoring and Analysis System (FSMAS) has recently released an emergency alert for these districts.

Table 44: Food Balance Situation in Some Study Districts

DISTRICT	All crops - Net edible (mt)	Requirement (mt)	Balance (+,-)	(%)
Jajarkot	28,873	30,462	-1,589	-5
Dailekh	43,563	51,427	-7,864	-15
Achham	21,452	51,737	-30,285	-59
Kalikot	11,299	22,738	-11,439	-50

The MOAC data supports this and portrays a food balance situation as given in Table 44 for the year 2006/07. According to the table, all study districts except Salyan and Surkhet had negative overall balance with the highest deficit in Dailekh followed by Jajarkot. These one-year deficits must be considered "occasional" caused by natural calamities which were either uncontrollable or, at best were not controlled. A look at trend using last 5 years MOAC data and calculations presented in Table 46 portray a different scenario. According to the table, average deficit districts in terms of severity are Surkhet followed by Salyan and Dailekh. Other districts have marginal overall surplus. In terms of annual variation represented by variance/mean, the vulnerability order (swings in food security) is Salyan, Surkhet and Dailekh. In terms of annual trend, the deficit is declining in Dailekh, Jumla and Kalikot, and increasing in other districts. Currently, the food insecurity situation is exacerbated by more than proportionate increase in prices of food grains vis-a-vis the other non-food items. MOAC/WFP survey (July 2008) reports at least 15 percent higher price rise in food grains in the mid and far-western hills and mountains. July and August are critical months for food.

Table 45: District wise Balance Sheet of Edible Cereal Food (2006/07)

District	Population	Requirement (mt)	Production (mt)	Balance	
				District (mt)	Per capita (kg)
Salyan	234,972	47,229	53,892	6,663	28.4
Jajarkot	149,147	29,979	25,508	(4,471)	-30.0
Surkhet	325,831	65,492	75,484	9,992	30.7
Dailekh	255,305	51,316	39,501	(11,815)	-46.3
Kalikot	115,249	22,013	21,782	(231)	-2.0
Jumla	90,100	17,209	16,934	(275)	-3.1

Source data: Regional Directorate of Agriculture, Surkhet (computation)

Table 46: Five year Trend of District Food Balance (2002/03 to 2006/07)

District	2002/03	2003/04	2004/05	2005/06	2006/07	Annual trend	5-year Mean	Variance/ Mean
Salyan	(24,274)	(1,843)	(21,585)	3,715	6,663	6,743	(7,465)	(28,069)
Jajarkot	(4,260)	3,467	3,397	6,445	(4,470)	256	916	27,034
Surkhet	(25,575)	(19,115)	(40,060)	(21,798)	9,993	6,845	(19,311)	(17,279)
Dailekh	(596)	166	252	2,495	(11,816)	(2,011)	(1,900)	(16,876)
Kalikot	1,426	2,035	19,638	2,184	231	(224)	5,103	13,054
Jumla	3,503	2,768	4,826	4,329	(275)	(600)	3,030	1,331

Source data: Regional Directorate of Agriculture, Surkhet (computation)

It should be noted, however, that the district aggregate food balance is the lower limit of the individual household food balance. It is likely to be much higher at the household level because of asymmetry in cultivated land distribution and household production level. MOAC/WFP survey has identified following districts and VDCs being particularly vulnerable to food and livelihood insecurity.

- Kalikot – Pakha, Chhapre, Mahelmudi, Nanikot (3), Dhauligad (2), Khina, Thapu, Ramnakot, Badalkot, Dana, Lalu (1), Phoimahadev
- Dailekh – Ruma, Chauratha, Gamaudi, Kusapani, Naumule, Bhairikalikathan, Pagnath, Bisaliya, Baluwatar, Pipalkot, Lakandra
- Jajarkot – Bhagabati, Laha, Dasaira, Kotbang, Majhkot, Nayakhola, Paink, Ragda, Rokayagaon

4.10.2 COPING STRATEGIES

The coping strategies against food insecurity are found to be the following:

- Take children out of school to work
- Consume seed stocks held for the next season
- Skipped day without eating
- Reduced proportion of meals/reduced number of meals
- Collect and sell firewood/NFTP
- Collect wild food
- Spend savings on food
- Borrow money/buy food on credit
- Rely on less preferred and less expensive food
- Sell land, animal and other household assets often in distress value (unsustainable coping)
- Migrate outside for job/earning

4.10.3 PROJECT'S LIKELY IMPACT ON LOCAL FOOD SECURITY

The project will have two distinct components – i) to improve productivity and returns of the existing HVA commodities and NTFPs (particularly the cultivated ones) through irrigation provision, better package of practices, enhanced access to quality services, access improvements (roads and gravity ropeways, loss reductions at various levels by improvements in storage and handling, enhanced value addition from processing, etc; and ii) expansion of acreage under HVA commodities and cultivated NTFPs. The first component is expected to have the following impact on food security:

- Household food production may be slightly reduced from the diversion of labour for HVA improvements but this will be more than compensated by the spill-over effect of improved services and production infrastructure such as irrigation on cereal crops;
- There will be improved income security at household level to buy food;
- Access to food (for purchase) will also improve by the improvements in roads and ropeways

The second component is likely to displace some traditional food crops in the uplands such as maize, millet but the return from displacing crops (HVAs) will be much higher than the value of food production foregone. Hence, if the food is available for purchase, the households will be better off.

The only problem will be in those areas like the Palanta area of Kalikot where purchasing food may be difficult even with the availability of cash.

4.10.4 SUGGESTIONS FOR FOOD SECURITY IMPROVEMENT

Not disturbing rice and cereal land in lower altitudes by HVA and NTFP expansion

The study has shown that the returns from HVA and NTFPs can be significantly increased by improving

the production efficiency and by adopting value addition measures. Any area expansion for HVA and privately cultivated NTFPs can occur in the uplands where returns from these enterprises will be much higher than the traditional food crops. Even in MOAC/WFP food security assessment, it is not found that people have died in want of food. All coping strategies indicate lack of income to buy food rather than unavailability of food which has forced many households to adopt negative coping (unsustainable coping) such as selling land, livestock and other productive assets in order to buy food. Only in remote areas above 2-3 days of walk from the district headquarters, situations of food not being available even with cash payment is reported. Within the study districts, such areas are found to be only in Kalikot (5 VDCs in Palanta area). In other areas, income security is a perfect substitute for food security, and what better income security than the organized production and trade of HVA commodities and NTFPs.

Credit for consumption to the poor when relatively long gestation crops are planted

Long gestation crops are mostly tree crops like apple, walnut which take considerable time to reach first harvest. These HVAs are not poor-friendly. Should the poor and insecure households grow these trees because of climatic suitability, they must be provided with the consumption credit until the period of first harvest.

Reducing cereal production gap with better package of practices

As indicated earlier, the productivity of food crops in the study districts is very low due to the adoption of insufficient package of practices and lack of knowledge about improved farming. The project will need to support skill development programmes to reduce the cereal yield gaps.

Micro-irrigation expansion and soil water conservation

Irrigation is known to enhance production and productivity of crops in two ways – i) increased yield per unit land, and ii) increased cropping intensity. The combined effect of these two can increase total production by at least 50 percent. However, the surface irrigation systems for the sloppy uplands may be environmentally unsuitable and the areas also do not have lavish water sources to build such systems. The best water conserving irrigation models for these sloppy lands are the reinforced plastic ponds for collecting rain water supplemented by some small sources. The water thus collected can be used in the fields with the help of sprinkler/drip systems. Low cost systems such as these have been developed and extensively used in Nepal by I/NGOs such as IDE, ITDG, SAPPROS and so on with proven results. costs only half of the conventional

irrigation systems or the cemented tanks. The technology has further improved in balloon shape thus obviating the need to dig the pits for water storage.

Soil water conserving technologies such as mulching, the use of alkasol can be promoted simultaneously.

System of Rice Intensification (SRI) in Upland rice

Average rice yields in the project districts are very low (less than 2 mt/ha). Under water-controlled conditions, the rice yields can be easily doubled with the adoption of a special process called "System of Rice Intensification (SRI)" which is applicable to all rice varieties. Upland rice is grown up to an altitude of 1,800 masl in Kalikot and Jumla. Some experiments on SRI are also undergoing in the districts although this technology has been proven in other districts. RDGB is testing SRI in Jumla (in 4 locations – Guthicham, Bhumaramandicham, Patarasi and Tamti). Once proven, this technology can be promoted with training.

Change in food habit

As shown in box 8, the people of the mid west hills and mountains are overtly hooked to rice eating. Other traditional cereals are only considered as Tiffin materials and coping alternatives if rice could not be bought. Rice is considered "white poison" in areas where there is health and nutritional awareness. Such awareness must be inculcated through social mobilization. In Jumla, the piloting to transform the traditional cereal grains to more palatable forms such as cake is undergoing with the help of World Vision.

Box 8: Mid-West's Obsession for Rice

The notion of food security for the hill and mountain dwellers of the mid-west region is that of "rice security" rather than "calorie security". The people there often disclosed that if at least two meals of rice are not taken in a day, the person is food insecure. A WFP study (HMG/WFP/CONCERN Worldwide, 2007) has compared the prices of various cereals and found that the use of cereals other than rice could almost double the food security period in the region.

Many reasons were cited for rice's superiority – i) rice is more tasty; ii) rice is easier and quicker to cook; and iii) rice does not have to be chewed (time saved in eating). The third reason was interesting – the local people did not chew while eating the cooked rice. The reason was that it will be digested quickly if chewed and they will feel hungry again sooner. This is another innovative coping in food security. Another respondent added – "Rice is a more socially prestigious and complete food. According to Hindu mythologies, whenever there is some reference about food, it is about rice. So, god has provided only rice as the complete cereal food".

Using unmarketable fruits as source of alcohol

It is reported that a large part of the food grains are converted into alcohol (although the practice is illegal) mostly in the district headquarters. This has implications on the local food security. The government should simplify the process of registering the alcohol production enterprises using low grade fruits.

Action Plan/ Recommendation

The IFAD project to be based on this study finding will have to carry out the following broad components:

5.1 SOCIAL MOBILIZATION AND AWARENESS CREATION

The purpose of social mobilization is to augment the social capital in a village or a community for efficient creation and management of public goods like it is more or less automatically done in the case of private goods. Current social mobilization carried out in the study district, for that matter in the whole country, is a one-size-fits-all model. This is not right. It has to be tailored to suit the context of the community being mobilized.

5.2 ORGANIZATION OF SMALL PRODUCERS INTO GROUPS/COOPERATIVES

Organization of community into groups or cooperative becomes instantaneous or at least much easier after proper social mobilization to reach the level of conscientization (full internalization of the messages). The need for organization of the poor producers/traders is to achieve optimum scale of operation (which large producers/traders can achieve alone) as well as to enhance the price bargaining advantage. In the study districts, the groups and cooperatives have been found to be organizationally very fragile, lasting as long as the project/program. There are several reasons for this phenomenon:

- Often elite control of the groups or cooperatives;
- Formed without conscientization (from tailored social mobilization) (groups formed for project rather than for communities' requirement);
- Often formed against larger and influential traders' interest; and
- Asymmetry in responsibility allocation and benefit distribution;
- Voluntary works leading to intra-household conflict

These reasons leading to failure of groups/cooperatives must be fully considered. The study Team is against creating a separate group for each project. In many sites of the study districts, a number of single households have been the member of several groups. The existing groups can be socially mobilized and reorganized. The study has found that the existing groups are loosely formed and thus weak in the most desired trait – the cohesiveness. This is because of the lack of specialization within members which makes each member dependent on the other. The specialization also acts in favour of efficiency (in production/trade). The groups/cooperatives must be developed in a way which makes the members individually dependent on other members with the whole group being self-reliant. In technical terms, it is labeled as "dependency-based self-reliance".

Oranges



5.3 INFRASTRUCTURE IMPROVEMENT

The infrastructure for HVA commodities and NTFP production and trade is found to be very weak and inadequate in the study districts. This has increased the transaction costs of the producers/traders and foiled the value addition opportunities. For example, the base of all HVA and NTFP trade funnel – Surkhet, is much nearer to Nepalgunj than to Kapurkot in Salyan district. However, over 75 percent of the vegetables come to Nepalgunj from Kapurkot. This is because of the better infrastructure in Kapurkot side.

5.3.1 PHYSICAL INFRASTRUCTURE FOR PRODUCTION/PROCESSING/TRADE

Access Infrastructure

The road network is spreading very fast in the study districts with the decentralization of local road construction to the local governments (DDCs/VDCs). Many connecting roads to the main corridor roads have already been completed or are on-going. However, these roads are not graveled/properly graveled for hauling goods. The dirt roads have been badly damaged by the tractor movements. Hence, the major access constraint is non-operation of the connecting roads and even the corridor roads during the monsoon season from June to August, when bulk of the off-season vegetables is ready for sale. In corridor roads, the bridges need to be built in Salli bazaar and Ramaghat. All roads need to be upgraded to at least graveled status for all-weather operation. Bridges in different spells of the local rivers can increase the funnel area of supply.

The following example shows how important is road for Karnali people. Before the road, less than 30,000 saplings of apple were planted in Jumla but when the first vehicle entered into the district recently, the apple plantation shoot up to 100,000 saplings in 2007/08. Major off-season vegetables in Surkhet comes from Ratanangla and Guranse in the Surkhet –Dailekh corridor. Hence, the 23 km road from Surkhet to Guranse must be upgraded to at least gravel status. In Surkhet-Jumla corridor, a bridge is needed in Ramaghat and other few suspension bridges in River Karnali to link with the production pockets of Achham.

The gravity ropeway, first developed in Himanchal State of India, is a transport system using earth's gravitational force without having to use fossil-fuel or electricity. For every 100 kg goods hauled from top, it can lift 30 kg to the top. This ratio is being further improved by GRID Nepal, the native manufacturer. When cable prices were low, it was designed in bi-cable system. However, with over 50 percent increase in cable (metal rope) prices within the last one year, it is being re-designed

as mono-cable system which reduces cable requirement by 66 percent. This is considered as an "Induced Innovation" – the huge inflation being the inducing factor. Other innovation is in the area of introducing the braking-system through the conversion of kinetic energy generated by the system operation into small amount of electricity for supporting the braking system. This is important because, when there is slight imbalance in load, or when the gradient is high, there may be chances of small accidents, although there is built-in system of sand bag cushion. The introduction of improved braking technology can also improve the system's replicability to gradients up to 30o from the current maximum of 22o. A system case study in Bishaltar of Dhading district has shown that the gravity ropeway is 100 times faster and 5 times cheaper than the same load carried by human. This is besides, damage-free transport which is important particularly for organic products. In order to run the system year-round, an innovative concept of multi-station system can be planned which can capture the products from different elevations having different production seasons.

The sites appropriate for gravity ropeway are many in the study districts. These will be most appropriate in surkhet-Jumla corridor from Ramaghat to Khidkijyula, Hulma, and from Myanma to Nagma. In Surkhet-Dailekh corridor, it can be useful in connecting Dandaparajul height to Makhlo Dungeshwar and from Chupra to orange producing hills of Dullu region. In Chhinchu-Jajarkot, Botechaur to Nagachuli could be a useful site. In these road lengths, important production pockets lie much above the corridor roads and current human portering has been expensive and unsafe for goods transport particularly during monsoon season. These sites have to be technically and socio-economically investigated before the component implementation.

5.3.2 MARKET INFRASTRUCTURE

Surkhet, the major base of the HVA commodities and NTFPs is likely to be larger trade centre than Kohalpur/Nepalgunj in next about one decade when the planned roads linking Mangalsen in Achham district and Dang are completed. Hence, Surkhet a large agricultural and NTFP mandi has to be developed in Surkhet with full facilities such as 2,500 mt cold storage, weighing bridge, wholesale yards and stalls, canteen facilities, trader houses, etc. The mini-mandies to support large Surkhet mandi can be established in Nagma, Rakam, Makhlo Dungeshwar and Salli bazaar. A system of weekly hat bazaar can be developed in several large production pockets as base-tier market. Much of the investment for these purposes can be generated from private sector and public-private partnership ventures.

5.3.3 SUPPORT FOR SERVICE INFRASTRUCTURE

Irrigation development: This has been described in food security section.

Storage: Cellar, rustic and pit storages must be considerably increased in the production pockets.

5.4 TRAINING

Following training needs for different stakeholders are identified:

5.4.1 FOR TRADERS

- Value chain, value addition processes and technologies, end uses
- WTO/ISO guidelines and requirements
- Business principles
- Accounting and record keeping

5.4.2 FOR PRODUCERS

- Value chain, value addition processes and technologies, end uses
- Integrated Plant Nutrition System (IPNS) for HVA products and NTFPs
- Integrated Pest Management (IPM) for HVA crops and NTFPs
- Group/Cooperative operation
- Accounting and record keeping

5.4.3 FOR SERVICE PROVIDERS

- Value chain, value addition processes and technologies, end uses
- Input quality checks
- Service principles
- Refresher trainings (mostly for poor producers)

5.5 RESEARCH AND DEVELOPMENT

There are many unexplored NTFPs, untested varieties of crops and trees, unknown insects, pests and crop diseases, yet to be adopted processes of value addition, etc in the study districts. For example, nobody knows why rittha fruits are dropping prematurely from the trees? Why Jumla apples are small-sized? Some progressive farmers like Padam Mahat from Jumla are testing some new crops and new processes. The project should set aside some funds for such R&Ds.

5.6 SUPPORT FOR VERTICAL NETWORKING IN THE VALUE CHAIN

There is very little coordination among value chain agents and actors in the study districts. There are monopoly and cartel arrangements prohibiting easy entry into the chain. The producers/collectors are receiving unfair share of prices for their products. The project can develop network for contract farming (with predetermined prices of products). BIRTHAL, Joshi and Gulati (2005) observed that the firms find it more convenient to contract with organised smallholders because of the following advantages:

- A low risk for overall supply in the event of crop failure;
- More flexible production portfolios of smallholders;
- Higher quality of products because of strict compliance of mandated production practices; and
- Greater dependency of the smallholders on the production firm.

5.7 M&E SYSTEM INCLUDING MARKETS AND PRICES

M&E shall be an important component of the project. The baseline information has been provided in this report for evaluating incremental project performance. Besides, the indicators for poverty, gender has to be prepared. The database of prices of HVA products and NTFPs along with a system of forecasting and dissemination has to be established.

5.8 POLICY INFLUENCE

Several policies in agricultural and Forest sector, and even where policies are right, their implementation/enforcement on the ground, to value chain development of HVA products and NTFPs are not compatible. As a donor, IFAD can influence the correction of such policies. Below are some examples of policy flaws which need reform:

- The quota-based subsidy policy of agriculture for inputs is not favourable to private sector investment in agricultural inputs trade and the subsidized inputs are not available to the poor;
- The demand driven nature of agricultural extension service is not favourable for the poor producers as the cost of seeking services often exceeds the probable gains;
- The full-input "point extension" model followed by agricultural extension agents is not within the range of poor producers. What is needed is "range extension" which is applicable to all types of producers;
- The royalty rates on several NTFPs are not scientific and thus do not correspond to the market value of the products;
- The processing requirements for export for many NTFPs are not clearly defined in the Forest ministry guidelines.

5.9 OTHER RECOMMENDATIONS

- None of the traded HVAs and NTFPs have defined standards (from Nepal Standards). Hence, the process to define the standards for the selected products is urgent.
- Expansion of commercial areas under apple orange, walnut and mango are constrained by limited production of high quality planting materials. Mechanisms to produce large

numbers of plants should be searched and implemented.

- The current productivity quality and cash income of farmers from fruit orchards are very poor due to lack of orchard management like pruning, training, manuring disease and pest management, mulching and poor post harvest measures. Demonstration of these management practices is important. Similarly, use of green manuring of legume crops like bean around each plant and turning them into the soil will improve soil productivity. Ten kg biomass open plant will be adequate for bearing trees of 8-12 years old. This 10 kg supplies about 400 gm Nitrogen which is the minimum need for apple or orange or mango bearing plant.
- The improvement of keeping open animal manures system should be made so that nutrients are not lost during storage. Heaping manure and protecting them through shades or any means must be practiced.
- Use of low cost soil fertility improving micro organisms like Azoto, Azosp, Psiz mixed with organic manures will provide the Nitrogen at 80-100 gm per plant.
- Two foliar application of liquid, potash, amino acid and zyme which all are organic manures after fruit set will make the fruit very attractive shining colour and weighty.
- Jatropa (known as diesel plant or andil) fencing of the HVA crops with pipla and indreni can increase the cash income of the growers.
- On-farm storage of apple spices and orange for two-three months after harvest improves the income of farmers by 2-3 times. Promotion of this system is very helpful for small farmers. Similarly, storing of apple on cold storage by wholesalers at Kohalpur cold store not only increase the income of marketers but also supply the apple fruit regularly from Jumla produce. This indirectly helps the producers.
- Value addition activities like grading, cleaning, packing and harvesting at right time and use of consumer and marketers preferred varieties are lacking and these areas should be improved in other value chain i.e. fruit, vegetable and spices crops. These are inexpensive technologies and should be carried out from farmer to retailer levels.
- The present production is too low and will increase sharply after the road construction is completed. In view of these, establishment of large wholesale market centre at Surkhet is needed both for domestic and export markets to India. Similarly, large size collection centre along highways at the distance of 5 kilometers and one each at Jumla and Myanma is equally important. These collection centres should also act as input and technology providing centres. (Gyan Kendra and Bigyan Kendra).
- The provision of suspension bridges joining collection centre from other sides of highway of Achham, Kalikot (Bharata, Gureta, VDCs) and Jumla Districts is essential.
- Market promotion of HVA of three road corridors through exchange visits of marketers, exporters, importers from Nepal to production, areas and visits of growers to market centers is helpful for market expansion of these HVAs. Similarly, promotion of these commodities through TV channels, FM, radio etc. is also equally important.
- Supporting marketers and transporters is also indirectly supporting to the growers. However, to date all the service providers including donors have been supporting only to farmers. It is, therefore, supports to transports, collectors, wholesalers, retailers, exporters, processors etc are equally important particularly in cash crops or market based high value agriculture commodity. One of the reasons for slow development of HVA is only the supports to growers.

PART 2

Demand Side and Import-Export Analysis

Background

Part 2 focuses on another aspect of value chain development - how to find the right (larger) buyers, traders, companies who have a demand for a certain product which a future project could fulfill. The project commits to organizing the supply side, while the companies commit to buy at a certain price and quantities.

Beans



Objective

The objectives of the extended contract are as follows:

- i) Collecting basic data from the demand side.
- ii) To develop a process for engaging with the private sector: attracting traders and companies, selecting them and coming to an agreement on a collaboration in which the project organizes the supply side while the traders commit prices and quantities to be bought.
- iii) Understanding of the indication of interest from at least 6 companies.

Methodology

Part 2 focuses on another aspect of value chain development - how to find the right (larger) buyers, traders, companies who have a demand for a certain product which a future project could fulfill. The project commits to organizing the supply side, while the companies commit to buy at a certain price and quantities.

Agricultural Imports, Exports and Trade Balance

After Nepal's accession to WTO, The Plant Quarantine Office within the Ministry of Agriculture and Cooperatives has become the only official source to obtain agricultural import and export data for the country. In 2006/07, Nepal imported agricultural commodities valued at Rs.3.19 billion from 13 countries ((Australia, India, UK, Denmark, China, Italy, Japan, USA, Korea, Thailand, Mexico, Singapore, Netherland). The export, on the other hand, has been of the order of 3.56 billion with export to 22 countries ((UAE, Bhutan, Belgium, Bangladesh, Russia, Sri Lanka, Hongkong, Pakistan and 13 above countries). The number of countries with which import and export transaction has taken place is increasing in number every year. So, on the agricultural trade diversification front, Nepal is doing well. Not only this, the data also shows net positive balance in agricultural trade in 2006/07 by about 370 million.

The two period data was collected and compiled for the commodities selected by the DVN study team for the years 2005/06 and 2006/07 which has been presented in Annex-3 and Annex-4 respectively. On the commodities selected by the DVN study, The data shows that the highest agricultural export item was ginger followed by Rittha, Jatamasi and cabbage. The compilation of net import presented in Table 1 shows that, while all commodities except cabbage and NTFPs had net positive import in 2005/06, beans figured in the net export category in the succeeding year. Highest net import was that in apples (2.38 billion), 80 percent of which came from China. In fact, the growth in import of apples increased by 162 percent in 2006/07 compared to the previous year. A clear case of growing import substitution was recorded in the case of Mango, cauliflower, cow pea, orange and banana. The export of cabbage increased by almost 60 percent in 2006/07 compared to the previous year.

A note of caution about the above data is that it represents only the formal trade which will be correct in the case of direct third country import and export. In the case of India which still remains the largest trading partner of Nepal, there is very high level of informal trade and it is estimated that the formal trade accounts for only about 20 percent.

Mangos



Table 1: Nepal's Net Import of Selected Vegetables and Fruits 2006 and 2007

Commodity	Net Import (Rs.000)		Percent change
	2006/07	2005/06	
Cauliflower	199.94	469.35	-57.4
Tomato	2292.13	1416.8	61.8
Cowpea	27.9	108.17	-74.2
Cabbage	-4157.9	-2607.8	59.4
Beans	-8.25	22.9	-136.0
Onion	39180	33375	17.4
Apple	23761.9	9041.8	162.8
Mango	3294.5	10782	-69.4
Orange	1813.9	2928.3	-38.1
Banana	7617.5	8367	-9.0

Source: Plant Quarantine Office, Department of Agriculture

Except NTFPs, all other commodities were imported at some period of time in a year and exported at other period of the year. Nepal's export of vegetables is due to off-seasonality while in the case of ginger and herbs, it is because of the uniqueness of the product and the competitive advantage. The months when the exports and imports of each commodity occurs has been shown in Table 2.

Table 2: Timing of Import and Export

Commodity	Export period	Import period
VEGETABLE		
Cauliflower	November to February	All year, highest in December
Cabbage	June to November	All year, highest in April
Tomato	May to August	All year, highest in March
Carrot	March	December to June
Green chilli	July to September	All year, highest in February
Onion		All year, highest in August
FRUIT		
Apple	July to November	All year, highest in February
Orange	November to January	November to May
Mango	June to August	Max in June
NTFP		
Jatamasi	November to June	
Timur	November to June	
Sugandhawal	November to June	

Source: Plant Quarantine Office, Department of Agriculture

Box 1: Process of Getting the Import and Export Permit

Nepal has become the 147th member of WTO from April 23, 2004. The form to be filled for this purpose is provided in Annex-1 of the Plant Protection Rules 2031. The Sanitary and Phyto-sanitary (SPS) agreement recognizes the importance of Plant quarantine and hence the import and export permit has to be issued by the Plant Quarantine Officer of the Department of Agriculture. Once issued, the import permit is valid for 3 months. The importers have to bring along with the imported goods the phyto-sanitary (plant health) certificate issued by the concerned country. After the import consignment enters the country, the Plant Quarantine officials will examine the compliance requirements before releasing the imported commodities. The fee for each import permit is Rs.10.

The requirements to get the import permit are:

- Copy of the firm registration along with invoice;
- If personal, photocopy of citizenship and passport
- The filled form as given in Annex-1 and 3 of Plant Protection Rules 2031;
- Specification of the purpose of the permit;
- Need to bring plant health certificate issued by the concerned country along with the import consignment.

For export, the form given in Annex 5 of the Plant Protection Rules 2031 has to be filled and submitted to obtain the phyto-sanitary certificate. Those who require these forms (Annex-1 and Annex-5) must obtain the Plant Protection Rules from the Department of Agriculture.

Box 2: Import Bans on HVA Commodities

Using the Plant Protection Act 2029 (Section 3) the Government of Nepal has banned the import of citrus saplings (to control the greening virus and other insects); import of potato from North America and Europe (to control Colorado potato beetle); North America, Costa Rica, Europe, Venezuela, Japan and New Zealand (to control bacterial ring rot); South Africa, Europe, Japan, North America, India (West Bengal) to control wart disease.; import of banana saplings from mid and South America, Caribbean (to control mosaic disease); Aner, Sanauwa, Sri Lanka, Ellis island, India, Pakistan, New Hebrides, North Borneo, Balis island, Philippines, West Samoa (to control bunchy top virus); Burma, Sri Lanka, Fiji, India, Indonesia, Malaya, Pakistan, Papua New Guinea, Philippines, Thailand (to control Panama disease), all countries where root nematode and black leaf streak are problems.

The tomato seeds can not be imported without the proof of heat therapy treatment.

On the part of potential importing countries like USA and European countries, the major problem is the stringent sanitary and phytosanitary requirements. These are understood to be done to indirectly negate the free trade access of the developing countries as per the WTO provisions and protect their own products.

Private Traders as the data Source

The other set of export and import data is collected from the traders (importers and exporters). The traders revealed that the most significant import substitution has taken place in banana. Until 5 years ago, about 80 percent of the banana traded in Nepal was imported – mostly from India. Now, 85 percent of the banana trade is of Nepali origin, mainly from Jhapa, Morang, Nawalparasi, Kailali and Kanchanpur.

Another potential for import substitution is in onions. Kathmandu valley alone is importing onions from Nasik, India worth Rs.1.44 billion. Total Nepal's import of onions is over Rs.3 billion. Apple is another candid product which can witness significant import substitution. Nepal is importing

nearly 15,000 mt of apple, mainly from China while only about 500 mt of total 10,000 mt apple produced in Karnali and Mustang arrives at the city and town markets/consumers.

According to the traders, the largest difference between the formal government data may be in the case of garlic. About 80 percent of the 10,500 mt garlic imported from China goes to India as entrapot trade which does not figure in government data. China seems to have a policy of exporting agricultural products to India with Nepal as the source of production (country of origin) because, according to the bilateral trade treaty between Nepal and India, there is no custom duty for agricultural products. If China directly exported the garlic to India, it has to pay about 50 percent of the value of product as custom charge.

Estimates of Demand and Supply

5.1 DOMESTIC DEMAND

The basis for demand calculation has been the minimum consumption requirement of 80 kg vegetables, 15 kg spices and 90 kg fruits per capita per year. The distribution of this consumption requirement across various commodities has been presented in Annex-7 along with the population. If 5 percent of the population in each region (those residing in the towns and cities) consumed the minimum daily requirement, the demand for HVA products will be as given in Table 3. According to the table, Nepalese towns and cities will require at least 92,000 mt of vegetables, 17,400 mt of spices and 105,000 mt of fruits. This will increase annually concomitant with the rate of population growth. This method of estimation gives the latent demand as the real demand is dictated by the purchasing power of the population and the price and income elasticity of each product. It is to be noted that no formal estimation of demand has been estimated, validated and published by any agency in Nepal. Hence the bold assumptions in estimation had to be made by the study team.

Table 3: Estimated Domestic Demand for Different HVA Commodities

Commodity	FWDR	MWDR	EDR	CDR	FWDR	Total
VEGETABLES						
OS tomato	2,385	3,600	2,025	1,350	990	10,350
OS onion	4,770	7,200	4,050	2,700	1,980	20,700
OS green chilly	239	360	203	135	99	1,035
OS cabbage	4,770	7,200	4,050	2,700	1,980	20,700
OS cauliflower	1,193	1,800	1,013	675	495	5,175
OS green bean	1,193	1,800	1,013	675	495	5,175
OS green pea	572	864	486	324	238	2,484
OS carrot	1,193	1,800	1,013	675	495	5,175
OS radish	4,770	7,200	4,050	2,700	1,980	20,700
Sub-total	21,200	32,000	18,000	12,000	8,800	92,000

Table 3 continued: Estimated Domestic Demand for Different HVA Commodities

Commodity	FWDR	MWDR	EDR	CDR	FWDR	Total
SPICES						
Ginger	1,908	2,880	1,620	1,080	792	8,280
Dry red hot chilly	191	288	162	108	79	828
Garlic	1,908	2,880	1,620	1,080	792	8,280
Sub-total	4,007	6,048	3,402	2,268	1,663	17,388
FRUITS						
Apple	9,540	14,400	8,100	5,400	3,960	41,400
Walnut	1,908	2,880	1,620	1,080	792	8,280
Orange	9,540	14,400	8,100	5,400	3,960	41,400
Mango	3,180	4,800	2,700	1,800	1,320	13,800
Sub-total	24,168	36,480	20,520	13,680	10,032	104,880

Source: DVN Estimates, 2008

5.2 Export Demand for India

The per capita basis of the demand for the products remains the same as in the case of domestic demand. The demand has been calculated for assumed 5 percent urban population of Uttar Pradesh, Uttaranchal state, Bihar, West Bengal and Delhi . The results are shown in Table 4. The results show that India can be a big source of export revenue for Nepal from the sale of HVA products. The total latent demand for vegetables is 684,000 mt, 119,000 mt of spices and 736,000 mt of fruits. To harness this demand possibility, a massive advertisement, policy reforms and export campaign has to be put in place.

Table 4: Estimated Export Demand for Different HVA Commodities In India

Commodity	UP+UA	Bihar	W. Bengal	Delhi	Total
VEGETABLES					
OS tomato	25,920	13,927	25,029	7,920	72,796
OS onion	51,840	27,855	50,058	15,840	145,593
OS green chilly	12,560	20,585	9,805	4,040	46,990
OS cabbage	51,840	27,855	50,058	15,840	145,593
OS cauliflower	12,960	6,963	12,514	3,960	36,397
OS green bean	12,960	6,963	12,514	3,960	36,397
OS green pea	6,480	3,481	6,257	1,980	18,198
OS carrot	12,960	6,963	12,514	3,960	36,397
OS radish	51,840	27,855	50,058	15,840	145,593
Sub-total	239,360	142,447	228,807	73,340	683,954
SPICES					
Ginger	20,160	10,832	19,467	6,160	56,619
Dry red hot chilli	2,073	1,114	2,002	633	5,822
Garlic	20,160	10,832	19,467	6,160	56,619
Sub-total	42,393	22,778	40,936	12,953	119,060
FRUITS					
Apple	103,680	55,710	100,116	31,680	291,186
Walnut	20,160	10,892	19,464	6,160	56,676
Orange	103,680	55,710	100,116	31,680	291,186
Mango	34,560	18,570	33,372	10,560	97,062
Sub-total	262,080	140,882	253,068	80,080	736,110

Source: DVN estimates, 2008

5.3 MARKET ARRIVAL OF HVAS

The market arrival of HVA commodities in the important wholesale market centres of Nepal are collected from the government. This has been presented in Table 5. Since data from all market mandies were not available, the results are not highlighted. Nevertheless, the covered markets represent at least 50 percent of the total arrival. On this basis, it can be said that Nepal needs to produce more to enter into large export market available in India because the current market arrivals are several times less than the potential domestic plus export demand.

Table 5: Market Arrival Quantity of Selected HVAs in Important Nepali Markets

Commodity	Kalimati	Birtamod	Dharan	Total
VEGETABLES				
Off Season tomato	3,321	237	1,421	4,979
Off Season onion	3,822	902	587	5,311
Off Season green chilly	2,997	650	481	4,128
Off Season cabbage	2,779	786	3,585	7,150
Off Season cauliflower	3,690	152	400	4,242
Off Season green bean	1,735	152		1,887
Off Season green pea	45	7	10	62
Off Season carrot	207	11	154	372
Off Season radish	2,282	286	1,185	3,753
Total	20,878	3,183	7,823	31,884
SPICES				
Ginger	1,656	40	1,565	3,261
Dry red hot chilli	307	38		345
Garlic	2,734	1,151	192	4,077
Total	4,697	1,229	1,757	7,683
FRUITS				
Apple	282	324	103	709
Walnut				-
Orange	3,880	138	354	4,372
Mango	148	18	70	236
Total	4,310	480	527	5,317

Domestic and Foreign Agri-Traders Related To Nepal's Agricultural Trade

6.1 THE DISREGARD AND NTFP TRADERS

The list of domestic traders (importers and exporters) and foreign traders from India and Bangladesh, who have been involved in either selling their products in Nepal and buying the products from Nepal, has been presented in the Tables (Table 6 for traders in India and Bangladesh, Table 7 for traders in Nepal at cooperative, industry and firm level, Table 8 for major Nepali traders outside Kathmandu and Table 9 for traders interviewed by the study team for business commitments) with address and contact phone numbers where available. The trade in which these traders specialize has also been given. Please note that it was not possible to get commitment for all the pro-poor HVA products identified by the DVN because of several reasons. The major reason was the high perishability of most HVA products.

Table 6: Traders from India and Bangladesh Traders dealing with Products from Nepal

Company	Address	Phone	Commodity dealt
INDIA			
Azmatullah Kuraisi and Mohd. Taj	Sabji mandi, Dealpir, Bareilly	2315615	Ag. Products and ginger
Chaman Lal Mohan	Azadpur, Delhi-110033	27436126	Ag. Products and ginger
Vipin Kumar, Anil Kumar	Azadpur, Delhi-110033	27247061	Ag. Products and ginger
Bishandash Mohinder Kumar	Azadpur, Delhi-110033	23976655	Ag. Products and ginger
Kalyan Dash Jitender Kumar	Kidwai, Kanpur	2640405	Ag. Products and ginger
Munna Lal and Co.	Lucknow	9839063303	Ag. Products and ginger
Siligudi Regulated Market	Mallaguri	512637	Vegetable
Ayesha Export	Nawabgunj, Bihar	9431423235	Vegetable
BANGLADESH			
M/S Mishu Traders sadhan	31-lane Dhaka-1100	011-863871	Ag. products
M/S Dhaka Firm	16/1 Alshanullah Road Dhaka-1100		Ag. products
M/S Sathi Enterprise	16/1 Alshanullah Road Dhaka-1100	017-520806	Ag. products
Bismillah Traders	19/2, Shahazada klane, Dhaka-1100		Ag. products
New Kumillah Firm	19/7 NannuMiya, Dhaka-1200		
Azim Miya	Badamthali, Dhaka	017-528798	
Bismillah Fruit Bhandar	Ranghpur	05121-4068	Fruits
Nadim Seeds	Seti bazaar, Dhaka	9569049	Vegetable seeds

Table 7: Nepali Traders at Cooperative, Industry and Firm Level

Company	Address	Phone	Commodity dealt	Remark
Bhudev Food Industry (P) Ltd. WEAN Cooperative Dabur Nepal (P) Ltd.	Ganabahal Kupondole Koteshwar	4256988 5544981 4478010	Rice, pulses Pickle, jam, handicraft Essential oil. Herbal products, honey	Agri-processing
Royal Everest Coffee Mills Himalayan Tea Industry The Strategic Group Gandaki Bee Concern Gulmi District Cooperative HPPCL (P) Ltd. HOTPA Golchha Organisation Salt Trading Corp. (P.) Ltd.	Panchkhal, Kavre Biratnagar Lalitpur Gongabu Gulmi Baneshwar Baneshwar Ganabahal Kalimati	4413959 5525316 5537246 4353258 075 520320 4229796 4495261 4250001 4270315	Coffee, beer Tea, Honey Herbal product Honey Coffee Coffee Organic tea Cereal products Honey, vegetables, fruits Cardamom, catechu, HVAs	Coffee processing Export Export Export Export to India
Agriculture Market Centre	Birtamod, Jhapa	023-540002		Export to India
Tarai Vegetable and Fruit Producers Cooperative Association (P) Ltd. Nepal Bee-keeping Association Dugar Group of Industries SEAN Kedia Group N.N. Herbal Ind. (P) Ltd. Health Food Industries National Trading Corp. (P) Ltd.	Birgunj, Parsa Chitwan Kathmandu Tripureshwar Kalimati Kathmandu Banepa, Kavre Teku	051-520056 056-531999 4437991 4252314 4270730 4285807 011-661765 4240643	Vegetable and fruits Honey Cereal, lentil, oil Seeds Milk, seeds, fertilizer Herbal products Baby food Ag. Machinery and tools	Export to India

Table 8: Major Nepali Traders outside Kathmandu

Company	Address	Phone number	Commodity dealt	Remarks
SPICE TRADERS Tarachand Bandel Shyam Bamsal N. C. Jain Dinesh Mittal	Birtamod, Jhapa Birtamod, Jhapa Birtamod, Jhapa Birtamod, Jhapa	02--540114 023-540081 023-541292 023-542637	Cardamom Cardamom Cardamom Cardamom	Export to India Export to India Export to India Export to India
FRUIT AND VEGETABLES Kostati Trading Concern (P) Ltd. New Narendra Trading Concern Nepal Seed Company Manakamana Spice Factory Srikrishna Masala udhyog Power Masala Udhyog Nepal Masala Udhyog Annapurna Food Products	Biratnagar, Morang Fikkal, Ilam Lalitpur Pokhara, Kaski Butwal, Rupandehi Chitwan Chitwan Birgunj Parsa	021-525492 4429364 5521292 061-528764 071-541285 051-529371 056-520964 051-528823	F&V Ag. Product Veg. seeds Ginger Ginger Ginger Ginger	Export Export/import

Table 9: Traders Interviewed by the Study Team for Business Commitment

Name	Address	Stall No.	Mobile	Commodity dealt
Parameswar Sah	FWM, Balkhu	33	9851075378	Indian fruits
Lok Bahadu Karki	Mahalaxmi fruit supplier, FWM Balkhu	52	9851036916 9851074821	Chinese apple, pear Orange
Bharat Khanal	Khanal F&V Suppliers	31	9851037225	Chinese apple and citrus
Amar Bahadur Baniya	Pokhara Fruit Centre, Balkhu	598	9841525329	Vegetable
Sanu Babu Panta	F&V market, Kalimati	11	9851090683	Vegetable
Umesh Khadgi	F&V market, Kalimati		9851067175	Green chilly, vegetables
Ramesh Shahi	F&V market, Kalimati			Green chilly, vegetables
Bhimsen Bharati	Bharati F&V supplier,			

6.2 THE COMMITMENTS

The DVN study team met with the larger traders of HVAs in the Kalimati and Balkhu mandies and tried to obtain their commitments on the demand side. Two firm commitments were obtained for the trade of Nepali apples from Karnali, Nepali onions (for import substitution) and Nepali oranges (even for export). In ginger, the system already exists and is doing well in terms of export. In other products it is assured that if the quality and price of these products are competitive, they would prefer Nepali products. The quality is not a problem in the case of apples and oranges (much higher quality than the imported product) but the shelf-life of Nepali onion is much lesser and there is sprouting problem for which varieties changes may be necessary. All traders listed in Table 9 have made an informal commitment to buy Nepali products if these can be competitive. The Karnali apple can be competitive in Kathmandu market even in the present state of high transportation because it can sell for higher price due to quality and taste. In other products, the commitment is difficult particularly for export because the price is dictated by the Indian traders and there are large price swings even within a short period of time. This is particularly true in the case of NTFPs. For example, rittha was selling for about Rs.10

per kg but when Germany imported it from Nepal via India, the price went as high as Rs.70 per kg. When there was no demand for rittha from Germany this year, the price has dropped down again to about Rs.30. In garlic, Indian's prefer Chinese garlic because of easy processing due to its large size. Even the Chinese garlic produced in Nepal is not of the same quality. So, there can be no commitment in garlic trade. In some other commodities like off-season mango and many vegetables, the inadequate volume of marketable product is a problem to obtain commitment. If IFAD project can improve production and quality, then the commitment could be firmer.

More assured commitment can be found in the case of organic products even for the cold chains of India like Reliance and Cargill. The reason is that the demand volume of organic products is currently limited due to unawareness and premium prices. The Organic Village, who is dealing with 128 organic products from Nepal and exporting these to Doha, South Africa and United States and Germany is willing to i) produce organic HVAs on contract basis and ii) to buy these products for export. According to them, the demand for Nepali organic products is increasing very rapidly in the third world.

Box 3: The Karnali Apple

The fruit traders at Balkhu, Kathmandu revealed that the apples from Karnali and Mustang are of highest quality – not matched by any of the imported product. However, due to the problems of collection and transportation, these apples have not been reaching the Kathmandu market and nearly 15,000 mt of apples are being imported from China and India. The apples from China and India are delivered on the basis of a phone call because the supply chain is adequately developed. Chinese apple, which comes from a distance of about 8,000 km is still competitive in Nepal and is gradually displacing the Indian apples from the market. If the roads are constructed and the supply chain is developed, there is plenty of scope to substitute the import of apples by the supplies from Karnali and Mustang. Mr. Choudhary, a trader from Balkhu brought 24 mt of apple from Jumla to Nepalgunj by helicopter, graded the product at Nepalgunj and brought those to Kathmandu. It was costly but yet was able to make sizeable profit from the transaction. Asked why he did not continue bringing Karnali apples, he said that even air-plane and helicopter facilities are inadequate and difficult. If Karnali highway is upgraded to all-weather level, most imported apples in Nepal could disappear from the Nepalese market.

6.3 THE RISKS

It was very difficult to obtain commitments for many products because of two reasons – i) perishability (for highly perishable products like tomato and cole crops) and ii) price risks (excessive swings). There is a need to improve the market infrastructure to reduce the level of perishability.

6.4 LINKING TO INDIAN COLD CHAIN

Discussion with Indian traders in Nepal and with the India Embassy official revealed that, except for some organic products, the link with the Indian cold chain is impossible at the current situation of HVA's market arrival in Nepal. AEC authorities revealed that it is quite premature to even talk about it for at least the next 10 years.

6.5 NON-TARIFF BARRIERS ON EXPORT TO INDIA

It is generally true that India is enjoying a better privilege in trading than Nepal. Indian products come much easier while the Nepali traders have to face several hurdles and hassles which often delays exports. As shown in the box, this problem was discussed with the high level agri-business delegation from India and India has accepted to take positive initiatives in these matters. Before Nepal became the member of WTO, such hassles were more and even within Indian territory for Nepali consignment. With Nepal's accession to

WTO, the hassles to the formal consignments from Nepal has been greatly minimized. The only remaining problem is that even for trading with near-by cities of India like Lucknow, Patna, the traders have to go to central Plant Quarantine Authorities located in Delhi for approval. If this system is decentralized (deconcentrated) in India, the trade situation will improve. Now, the state governments can only levy tax to Nepali products if such tax is also charged for the same Indian goods at the same rate.

The hassles, however, continue to exist for the informally traded goods. This is also equally true in Nepal for Indian goods but since the distance and check posts are much lesser in Nepal, the aggregate hassle is less for informal imports into Nepal. Nepali exporters have devised a coping mechanism against Indian hassles by delivering the consignment up to the border and then handing over those to the Indian traders who are well versed in dealing with these native hassles.

6.6 THE RECENT DEVELOPMENTS IN TRADE

Several initiatives for trade improvement within the trading regime of WTO are taking place in Nepal at both the private sector and the government levels. These have been summarized in Box 4. However, there are a number of other trade related hurdles and the government of Nepal is considered very slow in responding to these problems.

Box 4: New Developments in Agricultural Trade

- The Plant Protection Act 2064 has been passed by the Nepal's Parliament and has been published in Nepal gazette which now allows to import plant biological control agents; and also allows to re-export the agricultural commodities imported by Nepal
- Pest Risk Analysis has been completed and updated for 24 commodities (ginger, linseed, mustard, potato, lentil onion, radish, wheat, citrus fruits, mango, tea, coffee, cardamom, paddy, maize, coriander, pea, tomato, cabbage, banana, chiraunto, apple, garlic and strawberry). These have been notified to the WTO trading partners which is believed to help in the export of these commodities from Nepal;
- The laboratory equipment required for Phyto-sanitary certification (analytical balance, deep freezer, autoclave, pH metre, fumigation set, UV incubator, gas leak detector, illuminated magnifier, hydrometre, faxitron X-ray) have been purchased and distributed in required places.

A high Level Indian delegation of the Department of Agriculture and Cooperatives visited Nepal in 2006 in the context of simplifying the agricultural trade process between India and Nepal. The meeting decided on the following:

- The arrangement for the certification of plant health for the agricultural commodities exported from India to Nepal;
- Positive initiative on the part of Government of India to reduce the complexity and untimeliness in the export of Nepali agricultural commodities to India;
- Agreed to reconsider the Quarantine Supervision charges to make these more practical;
- Nepal requested to add 16 agricultural products and 19 NTFPs in the Indian Plant Quarantine Order 2003 which is being scientifically examined by the Government of India before acceptance.

Recommendations

The recommendations presented in this section are based on the problems of large trade houses who can potentially deal with sizeable export and imports of HVAs and NTFPs. These recommendations are over and above those which are presented in the earlier report on HVA crops.

7.1 IMPROVING GOVERNMENT STATISTICS ON PRODUCTION OF HVAS

Nepal Government's statistical database for the production of HVAs has not been scientific and up to the mark. Most of these data reflect the perception and crude estimates on the part of concerned agencies. For example, Nepal Government's data on the production of honey showed 500 mt for the whole country (2004) while the correct production figure was around 1,500 mt. When 500 mt of honey was exported to India and more was on the pipeline, Indian officials refused to accept further quantity saying that it may have been imported by Nepal from some other countries because Nepal's formal production statistics compelled them to think as they did.

The trade statistics for the HVA commodities also suffers from the documentation of only formally approved quantities while historically, about 80 percent of the trade with India has occurred from informal channels.

Hence, there is a need to adjust Nepal's HVA production statistics to reflect the reality.

7.2 FINANCING FOR TRADE

Financing for trade is the biggest problem for the traders. No bank is financing for the trade purpose. The traders are borrowing from banks against the collateral at an interest rate of 10 percent and the upper limit of financing is about one-third of the value of the collateral. Even the value of the collateral is fixed on a very conservative basis – about 60 percent of the prevailing market price. Thus the traders are getting loans equivalent to less than 20 percent of the real value of their collateral. An arrangement for financing the working capital for trade is, therefore, an immediate requirement.

7.3 FRUIT WHOLESALE MANDI AT KATHMANDU

In Kathmandu, the government has constructed the wholesale marketing facility at Kalimati which has greatly eased the vegetable wholesale trading. However, similar facility is lacking for the wholesale trade of fruits. Current fruit market at Balkhu is housed on a 15-year leased land with grossly inadequate facilities. The traders have

Apples



approached the municipality for such a trading space but to no avail. A fruit mandi at Kathmandu, is therefore an urgent requirement.

7.4 DEFINING AND MONITORING THE PRODUCT STANDARD

The standards for 104 agricultural commodities have been defined and monitored by the Government of Nepal. However, none of the HVA commodities and NTFPs which have been identified and prioritized by the DVN study team is in the list.

7.5 PRODUCING THE PRODUCTION PROFILE OF HVA COMMODITIES AND NTFPS

According to the WTO rules of which Nepal is a formal member since April 2004, the government has to make available the production profile and pest risk analysis to the WTO trading partners for those commodities which Nepal wants to trade. As of now, such profile has been prepared and provided only for 10 commodities including ginger. Without such a profile, the export is possible for non-commercial quantities defined by each country. India has defined non-commercial quantity as less than 200 kg. It varies from 100 to 300 kg for different countries. For bulk export, the government has to produce such profile for 100s of potential tradable commodities including those identified by the DVN study team.

7.6 PROMULGATION OF CONTRACT FARMING ACT

The Contract Farming Act has been drafted since last 2 years but it has not yet been passed by the Parliament. This has to be done as soon as possible.

7.7 GOING THE ORGANIC WAY

The data show that the production and trade of HVA commodities is increasing in Nepal. Together with this, the indiscriminate use of chemicals is also increasing in order to earn high and quick income. The evil effects of these chemicals have begun to surface among producers at the intensive production pockets like Panchkhal in Kavre district, Dhading district, Palung of Makwanpur district, etc and among consumers of the towns and cities. Chemical use related cancer and birth defects among children have begun to grow. Due to the chemical effect, the useful microbial activities for plant growth are reducing thus requiring more use of inputs over time to get the same output. This points out to the need for a massive campaign towards promoting organic farming. The current hurdle to this is the unfounded myth about organic farming at the government and farmers level that it involves higher cost and yields are lower. This may be true only in areas which are already highly toxified by the chemicals. Otherwise, in the larger "organic by default" context in many parts of the country, Nepal is nicely poised to go in a massive organic way for better returns to farmers and quicker poverty reduction. For this, the government has to support through the preparation and dissemination of organic package of practices for different commodities, support advertisement and certification arrangements.

Annex-1: Plant Quarantine Offices within Nepal

- National Plant Quarantine Programme, Hariharbhavan, Lalitpur
- Regional Plant Quarantine Office, Kakarbhitta, Jhapa
- Regional Plant Quarantine Office, Birgunj, Parsa
- Regional Plant Quarantine Office, Bhairahawa, Rupandehi
- Regional Plant Quarantine Office, Nepalgunj, Banke
- Regional Plant Quarantine Office, Gaddachauki, Kanchanpur
- Plant Quarantine Checkpost, Biratnagar, Morang
- Plant Quarantine Checkpost, Jaleshwar, Mahottari
- Plant Quarantine Checkpost, Malangawa, Sarlahi
- Plant Quarantine Checkpost, Tatopani, Sindhupalchok
- Plant Quarantine Checkpost, Rasuwa
- Plant Quarantine Checkpost, Krishnanagar, Kapilvastu
- Plant Quarantine Sub-Checkpost, Jhulaghat, Baitadi
- Plant Quarantine Sub-Checkpost, Lomanthang
- Plant Quarantine Checkpost, Tribhuvan International Airport, Kathmandu

Annex-2: Export of HVA Commodities and NTFPs from Nepal, 2006/07

Item	Country	Amount (Rs.000)	Qty (mt)	Price (Rs./kg)
Cauli	India, China	71.5	2.06	35
Tomato	India	153.1	5.87	26
Cowpea	India	110	14	8
Cabbage	India, China	20903	4185.3	5
Beans	India, China	175	25.1	7
Radish	India	3.2	0.16	20
Green chilly	China	40	2	20
Other vegetables	China	2729	60.5	45
Onion		0	0	
Apple	India, China	2	63.1	0
Mango	India, China	213	11.5	19
Orange	India, China	66	3.1	21
Banana	India, China	61	1.5	41
Jatamasi	India, Pakistan	6094	226	27
Rittha	India	41681	2036	20
Samayo	India	1699	26.2	65
Timur	India	16259	496	33
Atis	India	1239	69.74	18
Kurilo	Belgium, India	44	1.45	30
Kutki	India	2003	53.37	38
Other herbs	India	6949	413.24	17
Ginger	India	429302	35162	12
Garlic	India	385	9.6	40
Dried ginger	India, Germany	11268	1439	8
Radish seed	Bangladesh, Pakistan	2820	22.3	126
Potato tuber for seed		51.6	2.2	23

Source: Plant Quarantine Activities Report, DOA. Hariharbhavan, 2064

Annex-3: Import of HVA Commodities and NTFPs from Nepal, 2006/07

Item	Country	Amount (Rs.000)	Qty (mt)	
Cauli	India	1345	202	7
Tomato	India	10551	2298	5
Cowpea	India, China	682.8	41.9	16
Cabbage	India, China	277.5	27.4	10
Beans	India	271	16.85	16
Peas	India, China	62897	3797	17
Green pea	India	1982	395	5
Radish	India	63.4	6	11
Carrot		136.7	13.5	10
Green chilly	China			
Other vegetables	China	112.2	12	9
Onion	India	340473	39180	9
Apple	India, China	341915	23825	14
Mango	India	24096	3306	7
Orange	India, China	20368	1817	11
Banana	India, China	78688	7619	10
Jatamasi	India, China	13184	449.5	29
Rittha	India			
Samayo	India			
Timur	India			
Atis	India			
Kurilo	Belgium, India			
Kutki	India			
Other herbs	India			
Ginger		323.4	12.5	26
Garlic		148004	5645	26
Dried chilli		79687	3437	23
Tomato seeds	Japan, India, Thailand	2282	0.4	5705
Potato tuber for seed		263261	55666	5

Source: Plant Quarantine Activities Report, DOA. Hariharbhavan, 2064

Annex-5: Import of HVA Commodities and NTFPs from Nepal, 2005/06

Item	Country	Amount (Rs.000)	Qty (mt)	
Cauli	India	2563	469.7	5
Tomato	India	6679	1418	5
Cowpea	India, China	1620	110	15
Cabbage	India, China	531	72.5	7
Beans	India	376.4	22.9	16
Peas	India, China	43571	2828	15
Green pea	India	698	633	1
Radish	India	178	14.5	12
Carrot		74.92	9.74	8
Green chilly	China	7522	1608	5
Other vegetables	China	537.5	60.7	9
Onion	India	331430	33376	10
Apple	India, China	149133	9047	16
Mango	India	36563	10782	3
Orange	India, China	38025.2	3095.3	12
Banana	India, China	118263	8924	13
Jatamasi				
Rittha				
Samayo				
Timur				
Atis				
Kurilo				
Kutki				
Other herbs				
Ginger		302	32	9
Garlic		67799	3104	22
Dried chilli		29135.7	1204.4	24
Tomato seeds	Japan, India, Thailand	262.7	1.1	239
Potato tuber for seed		255438	45674	6

Annex-6: Basis for Demand Calculation (Minimum Consumption Requirement)

Product	Per capita consumption (gm)	No. of days	Total PC consumption (kg)
OS tomato	50	180	9
OS onion	50	360	18
OS green chilly	5	180	1
OS cabbage	100	180	18
OS cauliflower	25	180	5
OS green bean	25	180	5
OS green pea	12	180	2
OS carrot	25	180	5
OS radish	100	180	18
			80
SPICES			-
Ginger	20	360	7
Dry red hot chilli	2	360	1
Garlic	20	360	7
			-
FRUITS			-
Apple	100	360	36
Walnut	20	360	7
Orange	100	360	36
Mango	200	60	12
	No. of districts	Total population	
EDR	16	5.3	
CDR	19	8.0	
WDR	16	4.5	
MWDR	15	3.0	
FWDR	9	2.2	

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